MEMORANDUM

DATE: September 2, 1988

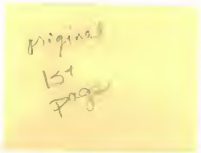
TO: All **Marketing Analysis and Planning Service**, **Company Analysis and Monitoring Service** and **Systems Integration Planning Service** clients

FROM: Bob Goodwin, Director, Vendor Research BG

SUBJECT: RESEARCH BULLETIN

Please find enclosed a description of Arthur Andersen's management information consulting practice. Arthur Andersen ranks as a leader in professional services activities and is now emerging as a major factor in systems integration as well.

This profile has been put together from public statements made by Arthur Andersen and Company.



ARTHUR ANDERSEN & COMPANY

PROFESSIONAL SERVICES MISSION

September, 1988

Arthur Andersen & Company is enjoying a phenomenally rapid growth in its Management Information Consulting (MIC) practice. It now has an annual revenue "run rate" of $1.4 billion in information related professional services. Billable hours in the U.S. for its first quarter of fiscal year 1988 (ending November 31, 1987) were up 27% and this rate has continued through the second quarter. Growth outside of the U.S. is even higher in billings, in the 35% - 45% range. AA & Co. is establishing itself as the leader in empowering organizations to effectively apply technology to their business advantage.

AA & Co. emphasizes intake of high-performing graduates directly from college. Many come from top colleges and graduate schools such as Harvard, the University of Chicago, and Stanford. About one-half of the intake has a technical degree in engineering or computer science. These new hires are put through an intensive training program and then given continued formal and on-the-job training. AA & Co. estimates it spends over $6,000 per year per person on education and training. This is actual cost not including lost opportunity cost. This training, along with their methodologies and tools, ensures consistent quality across projects throughout the world.

The general attitude of AA & Co. staff is very positive and aggressive. They are committed to on-time delivery of solutions to satisfy client needs. They are a bunch of hungry, bright people. An anecdote illustrates this.

> In February, on a cold, snowy Chicago evening, over 200 of their Chicago-based consultants voluntarily attended a meeting on their new CASE tool, FOUNDATION. The two hour meeting included presentations by AA & Co.'s technical, client service, and software marketing personnel on AA & Co. products and strategy in marketing a complete and integrated set of CASE tools. These meetings are held monthly and are very well attended. The Chicago office is their largest MIC office with over 1,000 consultants.

AA & Co. has 226 offices in 49 countries, with 81 in the U.S.

In terms of human resources, their biggest concern is that they did not hire enough people last year. Their total number of MIC professionals is over 13,000.

Industry Market emphasis for AA & Co. in the U.S. is as follows: Manufacturing, Telecommunications, Financial Services, State and Local Government, and the Federal Government. To this point they have been relatively weak in the Federal Government but are moving to strengthen their position. These industries have been chosen because of their attractiveness based on their size, technology employed, market image, available alliances, AA & Co.'s current position, and (for government) counter-cyclical economics.

For top companies in these and other key industries, full-time marketing teams have been established to penetrate the accounts and build long term relationships. The account teams are targeting mission critical opportunities with high information content, high quality requirements, and tight implementation schedules.

AA & Co.'s strategic services are a key vehicle for establishing early, high level entre into the target company. It supports AA & Co. in establishing business process change as a key value for buyers of Systems Integration.

A key feature of AA & Co. is its organization. Unlike other accounting firms, the consulting division has its own organization separate from the audit and tax structure. Thus, each of the AA & Co. offices has a managing partner in charge of MIC who reports through a regional organization to a country managing partner. This organization was put into place last year and has three major benefits for AA & Co.

- It reduces the audit/tax and MIC potential for conflict by giving the MIC group freedom from an operational and marketing perspective.

- It increases the size of the resource pools that can be tapped for client projects.

- It puts the organization into a structure that can easily be "spun-off" if the SEC or Congress so demands, or if AA & Co. chooses to do so. There is no current evidence that such a move is planned by AA & Co.

AA & Co. operates five Advanced Systems Centers which are large IBM computer facilities staffed with technical experts and project managers. Project teams use workstations connected to these centers for the automation of the application development process for each client. Thus, at least part of the development is done on AA & Co.'s computers, not the client's.

Associated with the Advanced Systems Centers are Advanced Technology Centers. These centers specialize in industry and function specific technology. Each has a working demonstration of the technology, e.g., a factory floor (at INFOMART in Dallas) or Engineering Design Department (London). The Technology Centers act as sites for AA & Co. R&D and training, and client Systems Integration projects and education. Additional Technology Centers are planned for the capital markets, insurance, and health care industries.

The Advanced Systems Centers, Advanced Technology Centers, and other software development sites will be linked together by a global voice and data communications network. The network management center will also serve as a client demonstration site.

Another organizational feature of AA & Co. is its strong staff function. A central Technical Services Organization (TSO) has about 500 people charged with keeping the worldwide organization at the forefront of information technology. Included within this unit are the development, maintenance, and support staff for the software products that AA & Co. sells. Product marketing directors are located in the major offices for client promotion and education in our software products. These software products include:

- MAC-PAC
- DCS
- FOUNDATION

The MAC-PAC software products provide manufacturing systems on IBM System/370 and System/38 computers. MAC-PAC/J.I.T. has been added which supports real-time communication with a CIM network. MAC-PAC has been particularly targeted for installation at defense contractors. It also supports both materials requirements planning and just-in-time techniques in an integrated environment.

DCS (Distribution Control System) gives comprehensive coverage of the distribution business cycle: order entry, billing, inventory control, warehouse management, outbound logistics, distribution requirements planning, purchasing, accounts receivable, and marketing information. It is the most widely installed mainframe product in the world. Its systems architecture provides it with significant flexibility through a customization facility and the capability for real-time integration of other hardware and software.

FOUNDATION is an integrated, automated software development environment designed to support the entire life cycle of application software development. Three software packages are included: Method/1, Design/1, and Install/1. Method/1 is a PC-based automated methodology with a fully integrated set of project management tools. Design/1 is a PC-based set of design tools including data flow diagrammers, prototyping capability, and screen and report painters, all using a LAN-based design repository. Install/1 is a mainframe-based code generator including test data management facilities and a fully extensible production data repository for DB2.

Other field functions coordinated by TSO are artificial intelligence and telecommunications centers of expertise. These are central "pools" which are used to support particular client projects.

TSO also operates a software intelligence group which has the following responsibilities:

- Gathering, evaluating, and disseminating comprehensive and up-to-date information on application software products and vendors.

- Working closely with software vendors to enhance their existing products by providing improved features and functions benefitting our clients.

- Informing firm personnel of new application software products, enhancements to existing products, and software industry trends.

- Monitoring software vendors and their products to alert firm personnel to major problems that can develop when implementing and using specific application software packages.

- Helping clients benefit from the most current knowledge and most recent "hands-on" experiences of professional personnel who have worked with and have an in-depth understanding of the capabilities of packaged software products.

- Supporting information professionals on client engagements by providing application software advice and technical assistance.

- Developing methodologies and tools to help ensure successful implementation of application software-based systems.

This software intelligence group has implemented a number of relationships with software products companies through the OASIS program. This program provides AA & Co. with in-depth knowledge of the products of key software companies such as MSA, SAP, and McCormack & Dodge. AA & Co. works on major projects implementing these software products.

Industry specialization, however, is not provided as a centralized staff function. AA & Co. partners and managers in the field with particular expertise and knowledge are assigned responsibility for developing and maintaining the firm's competence in particular industries. They are responsible for communicating new ideas and developments in each industry to all appropriate members of the organization. They plan and conduct seminars and serve as the primary sources for the development of on-going industry training programs. For example, a partner in their Atlanta, Georgia office has worldwide responsibility for building their practice in the telecommunications industry. He works with a core group of telecommunications industry partners from offices around the world. Each core group partner sells work in the industry and maintains a local base of employees knowledgeable in the industry.

These are also functional specialization groups concentrating in major business functions. Again, these groups are formed of line partners. Each core group identifies emerging business needs in its specialization and facilitates the development and delivery of services meeting those needs. Advice and information for promotions and engagements are provided to other firm staff as needed. Engineering is an example. It is headed by a Dallas partner who reports to the New York partner with overall responsibility for all of Operation Management. He is assisted by functional coordinators specializing in areas such as CAD/CAM/CAE, hardware integration, configuration management, engineering productivity, and automated mapping/facilities management.

The geographical organization is overlaid with the industry, functional, and software specialists. The overlay organizations are embedded in the field organization. This concept is a very strong and unique one. It ensures there is real-world contact by the specialist areas.

One particular strength being built is the support of Systems Integration, particularly in manufacturing. In just two years AA & Co. has established itself as the premier

CIM and manufacturing Systems Integration company primarily through a bold and innovative marketing plan, highlighted by the IMPACT exhibit.

In 1986, the IMPACT exhibit first made its appearance at the AMS show in Chicago. It was a fully integrated mini-factory occupying about 12,000 square feet and including equipment from about ten manufacturers. In 1987 it had expanded to 24,000 square feet with fifteen leading suppliers: it included over $18 million of hardware and software from IBM, Allen-Bradley, INTEL, Intergraph, and others.

The power of the exhibit was that executives from manufacturers can actually see CIM in action. The first year alone generated $7 million of orders for AA & Co. - over 100 of the chief executives from the top FORTUNE companies visited the exhibit in the first year.

The exhibit, expanded and with new technology, forms the core of one of AA & Co.'s Advanced Technology Centers. It has now been permanently sited at Northwestern University in Evanston, Illinois. The Center is part of the Basic Industry Research Laboratory and is actively connected to the research efforts of the University.

This is part of an aggressive promotional move by the firm. AA & Co. considers that the 1990's will bring a period of rapid consolidation in the industry and that it must get a critical position in order to be one of the surviving key players. As a result they are investing in an overall marketing program including public relations, seminars, and other promotional activities.

A major thrust in their promotion is to position the firm as the premier commercial systems integrator. They believe they have the objectivity and skills to be a unique provider of these services. They cite four reasons for being in it:

- Synergy - their existing engagements lead them into it.
- Culture - AA & Co. has a delivery orientation.
- Resources - their size and staff capabilities allow them to perform, plus they have the project management disciplines necessary.
- Demand - their customers are asking for it.

AA & Co.'s other major service lines, strategic services and education consulting directed to change management, complement and support the central Systems Integration thrust. Each service line has dedicated sales personnel and resource pools. Strategic services assists clients to gain competitive advantage through technology and other means. Change management makes the organization and work group changes to ensure successful absorption of the new technology by the company.

In summary, AA & Co. has a vision of where it wants to go and is building the organization, tools, and methods to make it happen. Its strong field operation is supported by an effective staff and excellent education and training facilities. Its growth rate should continue at a 25% to 30% rate for at least the next five years.

OCTOBER 1989

THE WORLD MARKET FOR COMPUTER SOFTWARE AND SERVICES

Prepared for

The European Strategy Board of SD-Scicon

by

INPUT

October 1989

INPUT®

1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300

Abstract

This report was written specially for the European Strategy Board of SD-Scicon. It contains data and information about the worldwide market for computer software and services and profiles of vendors representative of the competitive environment. Also discussed are the key driving forces of the computer software and services market and the nature of the competitive challenge.

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Introduction

Introduction

A Objectives and Scope

The specific objective of this report is to provide the European Strategy Board of SD-Scicon with a basic set of data and competitive information on the world market for computer software and services in a compact and accessible form.

This document (when issued in draft form) provided background reading for the presentation by senior INPUT staff, including INPUT's President, Mr Peter Cunningham, to SD-Scicon's European Strategy Board at the beginning of September 1989. The presentation focused on observations and conclusions that could be drawn from a study of the current market, its historical development and the issues and trends currently manifested. The primary purpose of the presentation was to identify possible opportunities and actions open to SD-Scicon in Europe and the world. The visual aid material used at that presentation is included in this document as Appendix A.

The scope of this study is primarily the European market, but this project has been titled the 'world market' in order to place it fully in context and to pay due attention to the significance of the U.S. opportunities throughout the world.

Regarding the competition, this report contains basic profiles of companies included on the basis of the likelihood that they will assist in identifying the "signposts to opportunity" within the computer software and services marketplace.

Additionally, the report provides a brief discussion of the most important trends and issues observable in the market.

B

Methodology

The research that contributed to this report was derived from three principal sources:

- INPUT's continuous Market Analysis Research Programme on the computer software and services business
- INPUT's Vendor Analysis Programme of the computer software and services business
- Additional research and analysis designed to provide specific research insights for SD-Scicon

C

Report Structure

The remaining chapters of this report are organised as follows:

- Chapter II is an Executive Overview that provides a summary of the key points contained in the body of the report.
- Chapter III provides INPUT's assessment of the world market for computer software and services—its size, development and forecast growth.
- Chapter IV discusses the key driving forces of the computer software and services market and the nature of the competitive challenge.
- Chapter V provides vendor profiles, brief summaries of basic data concerning companies in the industry, relevant to the study aims.
- The Appendixes contain the visual aid material used at the September presentation, INPUT's definitions for the sectorisation of the market, and market forecast assumptions.

Executive Overview

II

Executive Overview

This report was written as an advance reading pack prior to a presentation given by INPUT on the 6th September, 1989. This executive overview highlights some key observations from the market data to be found in Chapter III, and discusses two issues covered in chapter IV. This advance reading pack did not attempt to cover all the issues being faced by the computer software and services industry, but provided a platform for a wider debate at the presentation.

A

The Industry Outlook

The overall growth prospects of the computer software and services market are very positive, with high growth anticipated to continue over the next 15-20 years. The U.S. market is the dominating influence, representing about 50% of the total world market. Western Europe accounts for just over 25% and Japan 15% of the world market.

The two most important sectors by size are software products and professional services. The two highest growth sectors, but currently the smallest, are network services and systems integration. The two most significant industry sectors are discrete manufacturing and banking and finance. In Western Europe, each of these industry sectors accounts for over 20% of the entire market.

The continuing high growth prospects for the computer software and services industry are propelled, not only by the phenomenon of rapid computer technology development, but also by the changes in the application of information systems and in the overall economic environment.

These driving forces are not only creating growth but also changing the competitive environment of the whole computer industry. At one time dominated by the sales of hardware, the industry is now becoming dominated by the markets for software and services.

INPUT observes that traditional service vendors are adding products as the basis of developing further service business. At the same time, traditional product vendors are adding services to support the marketing of their products. These changes are partly effected through merger and acquisition activity and cooperative agreements.

Structurally the industry is fragmenting, with more and more smaller companies coming into the marketplace. Specialised sectors, particularly where heavy capital investment is required, e.g., for network services, show some concentration with only limited numbers of vendors being able to afford to compete.

Overall, the proportion of the total market accounted for by the top ten vendors has remained stable for some years at about 20%.

INPUT anticipates that in the future there will be increased competition between traditional product and traditional service vendors. The industry will continue to polarise around a relatively limited number of large vendors and an expanding number of smaller vendors.

B

The Market Opportunity

The worldwide market for computer software and services will exceed $200 billion in size by 1990. In Western Europe alone, the market is likely to exceed $50 billion this year. Not only has this sector achieved this substantial size, but its relatively high growth rate (around 18% per annum) is causing it to overtake the previously dominant equipment sales sector.

The U.S. market dominates the world scene, but its forecast growth rate of 15% per annum is the lowest in comparison with the other major groups. Nevertheless, it is expected to represent nearly 50% of the total world market in five years. The highest growth is anticipated in the smallest grouping—the 'rest of the world'. This includes all countries outside the U.S., Western Europe and Japan. This sector, even with an anticipated annual growth rate of 25%, is expected to represent only 7% of the total by 1994.

Within Western Europe, the market is dominated by the three largest country economies—France, West Germany and the United Kingdom. These three country markets represent about 60% of the Western European total, and this position is not expected to change markedly in the future.

INPUT divides the computer software and services market into six sectors or delivery modes:

- Processing Services
- Network Services

- Software Products
- Professional Services
- Systems Integration
- Turnkey Systems

Software products and professional services are by far the two largest sectors, each representing about 30% of the total in Western Europe. Network services and systems integration are the smallest sectors, accounting only for about 3 and 4% respectively of the industry total. However, these two sectors are experiencing the fastest growth—network services at 28% per annum, systems integration at 25% per annum.

Processing services and turnkey systems are the two medium-sized delivery mode sectors, each representing about 15% of the total market. The processing services sector is forecast to grow at the relatively low rate of 7% per annum, due to the continuing decline in conventional processing (or bureau) based services. This disguises the rapidly growing opportunity for systems operations (facilities management). The turnkey sector is becoming rapidly dominated by the equipment vendors as they seek to add applications software and services to their product portfolios.

INPUT's industry sector analysis indicates that discrete manufacturing and banking and finance are the dominant sectors, each representing around 20% of the total market. Process manufacturing, distribution, insurance and the services industries are the next largest individual sectors, each accounting for around 8% of the total market. The banking and finance and insurance sectors are anticipated to achieve relatively higher growth rates than the market average, with the distribution and transportation sectors showing strong growth also.

C

Industry Driving Forces

Technological advance is the key originating force behind the rapid growth occurring in the software and service market. However, that advance, particularly in communications technology, is also propelling changes in the way that information systems are managed and in the general environment. These in turn are creating new growth opportunities for the computer services business.

Over the last twenty years, we have witnessed a change in information systems from relatively simple standalone systems supplied by one vendor, to highly complex systems, integrating different technologies and sourced from multiple vendors. The needs to which these systems have been applied have developed out of the 'back office' environment to address every aspect of an organisation's operations.

These developments have resulted in information systems becoming increasingly 'mission critical' and consequently have presented senior executives with the need to manage their use and application strategically.

At a practical level, management responsibility for information systems includes the need to adopt new technology and integrate it within the overall environment. Technical and project management skills are vital to accomplish this. At the same time, there also exists the considerable challenge of maintaining existing systems. All of these pressures are creating services opportunities.

Additionally, rapid advances in every aspect of science and technology are having considerable impact on industrial processes and organisational methods. Rapid communications of goods, people and data have created the possibility of global markets. At the same time, competitive pressures have led to niche marketing and an emphasis on design, quality and service as differentiating factors. The search for ever more efficient manufacturing on a global basis and the meeting of niche marketing requirements are powerful driving forces for information systems and services.

D

The Competitive Environment

Perhaps the most obvious change that has occurred to the competitive environment for computer software and services is the relative blurring of the boundaries between the different sectors of the industry. As traditional service companies have added products as the basis of developing their business, so have traditional product companies added services to extend theirs.

This change has occurred partly through internal development, but also through the development of external relationships, cooperative marketing agreements, joint ventures and through merger and acquisition activity.

The principal feature of the competitive environment has been fragmentation. The proportion of the total market accounted for by the top ten vendors, both in Western Europe and in the United States, has remained relatively stable at around 20%. However, the total number of vendors has expanded considerably.

INPUT anticipates that this trend will continue, with concentration of the industry taking place where extensive subcontracting is necessary, for example in the systems integration sector. Merger and acquisition activity will continue as vendors seek to maintain their critical market position and acquire access to skill sets and management experience in new or expanding sectors of their business. Cooperative marketing agreements will also be used to achieve similar objectives.

INPUT anticipates that competition will intensify between traditional product-based vendors and traditional service-based vendors.

The competitive environment will continue to evolve in an increasingly unpredictable manner at the 'micro' level. At the 'macro' level, we can

be reasonably confident that it will follow the pattern described above, namely a further fragmentation in total numbers of companies, but with a relatively small group of large vendors maintaining a strong presence at the head of the market.

Some specific sectors will be concentrated, due to either the heavy capital investment required, as in the network infrastructure, or to a high incidence of subcontracting, as in the systems integration sector.

Observable now, but increasingly so in the future, smaller vendors will be reliant primarily on their expertise and their skill sets. Where smaller companies are product-based we can expect them to have a relatively short half-life, as market needs and technology change rapidly.

The larger organisations will prosper and grow, dependent upon many factors. The ability to anticipate and prepare for users' needs for total information system solutions is of paramount importance.

The World Market

The World Market

This chapter provides an overview of INPUT's assessment of the world market for computer software and services—its size, development and forecast growth. Essentially the data is presented in a form which shows the recent past (the values for the years 1987 and 1988), the assessment for the current year (1989), INPUT's forecast for the near future (1991), and the longer term, the five-year window (the year 1994).

INPUT's view of the structure of the computer software and services business and a description of the sector definitions can be found in Appendix B. Other market and forecast assumptions are set out in Appendix C.

The main point to note is that INPUT estimates market sizes as an assessment of end-user-derived revenues, and excludes captive revenues and revenues generated from other industry participants. The estimates are made in the local currency and converted to U.S. dollars for the purposes of consolidation and comparison. The conversion rates used are included in Appendix C. The historical market sizes have been converted using the 1988 rates as shown in INPUT's 1988 annual report. For 1989 assessment and forecast purposes, the 1989 conversion rates have been used. INPUT's forecasts are expressed in current currency rates, and therefore include an allowance for inflation.

A Overview

INPUT's world view of the size of the computer software and services business is shown in Exhibit III-1. This diagram shows a business that is now rapidly approaching the $200 billion level and is expected, at the currently forecast compound annual growth rate (CAGR) of 18%, to exceed $400 billion by the year 1994.

EXHIBIT III-1

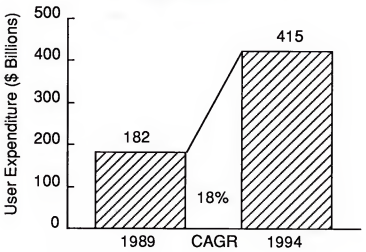


Exhibit III-2 shows the analysis of this world view by the principal entities from which it is formed: namely Western Europe, the USA, Japan and the Rest of the World. Exhibit III-3 is a graphical representa-

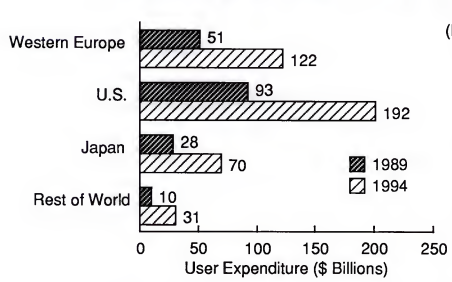
EXHIBIT III-2

World Software and Services Market by Major Geographic Region 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Western Europe	36	43	51	19	72	19	122	19
U.S.	67	79	93	17	127	17	192	15
Japan	20	24	28	18	40	20	70	20
Rest of World	7	8	10	25	16	23	31	25
Total	130	154	182	18	255	18	415	18

EXHIBIT III-3

World Software and Services Market by Major Geographic Region, 1989-1994



Total World Market 1989: $182 Billion 1994: $424 Billion

tion of the comparative size and growth of these entities for the five-year period 1989-1994. Key observations are:

- In 1989 the United States market accounted for around half of the total world market, Western Europe for just under 30%, and Japan for about 15%.
- The U.S. market is forecast to have the lowest overall annual growth rate, 17%, in comparison with the other groupings, Europe 19%, Japan 20%, and the Rest of the World 25%.

B

Key European Markets

The Western European market for computer software and services is forecast by INPUT to reach just over $50 billion in total in the current year. INPUT is forecasting a CAGR over the next five years of 19%, indicating that the market size should more than double to exceed $120 billion by 1994. Exhibit III-4 refers to this growth.

EXHIBIT III-4

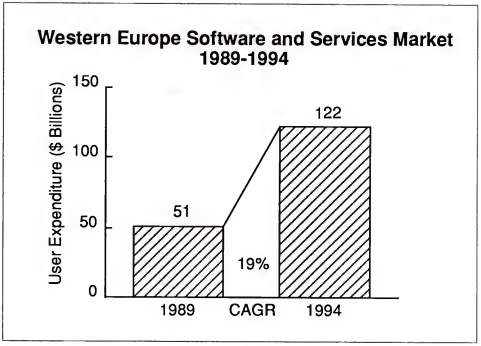


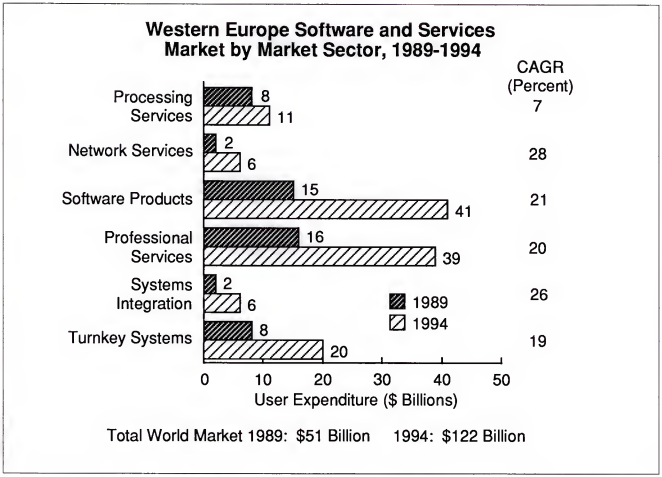
Exhibit III-5 provides an analysis of the total European market by principal sector, e.g., professional services, software products, etc. Exhibit III-6 shows, in graphic form, the relative size and expected growth for each of these sectors over the five-year period, 1989 to 1994.

EXHIBIT III-5

Western Europe Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	6.8	7.3	7.7	7	8.8	7	10.8	7
Network Services	0.9	1.2	1.6	34	2.6	28	5.5	28
Software Products	9.9	12.5	15.5	24	23.0	22	40.7	21
Professional Services	10.6	13.2	15.8	22	23.1	21	38.9	19
Systems Integration	1.3	1.6	2.0	26	3.3	26	6.4	25
Turnkey Systems	6.2	7.0	8.0	14	11.0	17	19.5	21
Total (rounded)	36	43	51	19	72	19	122	19

EXHIBIT III-6



It can clearly be seen from these two exhibits that the two dominant sectors, in terms of size, are professional services and software products, each of around $15 billion in size in 1989.

The smallest sectors are network services and systems integration, at only around the $2 billion level in 1989, but showing the fastest level of expected growth over the next five years, 28% per annum for network services and 25% for systems integration.

Exhibit III-7 shows the analysis of the Western European markets by key country markets, the U.K., West Germany and France. It also shows two further groupings denoted as secondary and tertiary markets. The secondary group, discussed in more detail in section C below, consists of the country markets of Italy, the Netherlands, Switzerland, Spain and Sweden. The tertiary group consists of the remaining country markets of Western Europe.

EXHIBIT III-7

Western Europe Software and Services Market by Major Geographic Region, 1987-1994

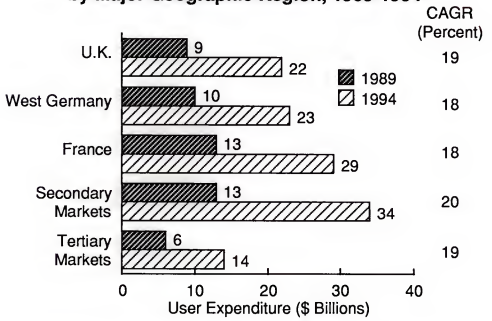
	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
U.K.	6.3	7.7	9.1	19	12.9	19	22.0	19
West Germany	7.1	8.4	9.9	18	13.8	18	22.9	18
France	8.9	10.6	12.5	19	17.5	18	29.1	18
Secondary Markets	9.2	11.2	13.3	20	19.2	20	33.5	20
Tertiary Markets	4.2	5.1	6.0	19	8.4	19	14.3	19
Total (rounded)	36.0	43.0	51.0	19	72.0	19	122.0	19

Note: Secondary Markets - Italy, Netherlands, Spain, Sweden, Switzerland
Tertiary Markets - Rest of Western Europe

Of the three key European country markets, France is by far the largest, being about 25-30% larger than both the U.K. and West German markets. Exhibit III-8 shows the comparative size and growth rates for these market groups.

EXHIBIT III-8

Western Europe Software and Services Market by Major Geographic Region, 1989-1994



Total World Market 1989: $51 Billion 1994: $122 Billion

A further analysis included, shown as Exhibit III-9, is that of industry sector markets. Discrete manufacturing and banking and finance clearly stand out as the two leading sectors, at over $10 billion each in the 1989 assessment.

EXHIBIT III-9

Western Europe Software and Services Market by Industry Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Manufacturing								
- Discrete	7.6	9.0	10.6	18	14.8	18	24.7	19
- Process	3.0	3.6	4.3	19	6.0	19	10.1	19
Distribution	3.1	3.7	4.4	19	6.3	19	10.7	20
Transportation	1.5	1.8	2.1	19	3.0	19	5.2	20
Utilities	1.4	1.7	2.0	18	2.7	17	4.5	18
Banking & Finance	7.6	9.1	10.9	20	16.0	21	27.6	20
Insurance	2.8	3.4	4.1	20	5.9	21	10.3	20
Government								
- National	2.4	2.8	3.3	18	4.6	18	7.7	19
- Local	2.5	3.0	3.5	18	4.8	17	8.0	18
Services	2.8	3.3	3.9	18	5.4	18	9.1	19
Other	1.3	1.5	1.8	17	2.4	17	3.9	18
Total (rounded)	36.0	43.0	51.0	19	72.0	19	122.0	19

An analysis by both service mode sector and industry sector is given for the three key European country markets of the U.K., West Germany and France. Exhibits III-10 and III-11 show the U.K. analysis, Exhibits III-12 and III-13 that for West Germany, and III-14 and III-15 that for France.

EXHIBIT III-10

U.K. Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	0.8	0.9	1.0	7	1.2	8	1.5	8
Network Services	0.3	0.4	0.5	29	0.8	28	1.6	28
Software Products	1.5	1.8	2.3	23	3.4	22	5.9	21
Professional Services	2.0	2.4	3.0	21	4.3	21	7.2	19
Systems Integration	0.3	0.4	0.5	24	0.8	24	1.5	23
Turnkey Systems	1.4	1.6	1.8	14	2.4	17	4.3	21
Total (rounded)	6.0	8.0	9.0	19	13.0	19	22.0	19

EXHIBIT III-11

U.K. Software and Services Market by Industry Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Manufacturing								
- Discrete	1.0	1.2	1.4	17	1.9	17	3.1	18
- Process	0.5	0.5	0.6	18	0.9	18	1.5	18
Distribution	0.6	0.7	0.9	19	1.3	19	2.2	19
Transportation	0.4	0.4	0.5	19	0.8	19	1.3	20
Utilities	0.3	0.3	0.4	17	0.5	17	0.8	17
Banking & Finance	1.6	1.9	2.3	20	3.3	21	5.8	20
Insurance	0.6	0.7	0.9	20	1.3	21	2.3	20
Government								
- National	0.5	0.5	0.5	19	0.7	20	1.1	19
- Local	0.5	0.5	0.6	18	0.9	19	1.5	18
Services	0.5	0.6	0.7	18	1.0	18	1.6	18
Other	0.2	0.2	0.3	17	0.4	17	0.6	17
Total (rounded)	6.0	8.0	9.0	19	13.0	19	22.0	19

EXHIBIT III-12

West German Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	1.4	1.5	1.6	7	1.8	7	2.2	7
Network Services	0.1	0.1	0.2	40	0.3	30	0.7	30
Software Products	1.9	2.3	2.9	22	4.3	21	7.4	20
Professional Services	1.6	1.9	2.3	20	3.3	20	5.4	18
Systems Integration	0.3	0.4	0.5	27	0.8	26	1.6	25
Turnkey Systems	1.8	2.2	2.4	13	3.3	16	5.6	20
Total (rounded)	7.0	8.0	10.0	18	14.0	18	23.0	18

EXHIBIT III-13

West German Software and Services Market by Industry Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Manufacturing								
- Discrete	1.8	2.1	2.5	17	3.4	18	5.5	17
- Process	0.6	0.7	0.9	18	1.2	18	2.0	17
Distribution	0.6	0.7	0.9	18	1.2	18	2.1	19
Transportation	0.4	0.4	0.5	18	0.7	17	1.1	19
Utilities	0.3	0.3	0.4	17	0.5	17	0.9	17
Banking & Finance	1.3	1.5	1.8	19	2.5	19	4.3	20
Insurance	0.5	0.6	0.7	19	1.0	18	1.7	20
Government								
- National	0.4	0.5	0.6	18	0.8	19	1.4	18
- Local	0.4	0.5	0.6	18	0.8	18	1.4	18
Services	0.6	0.7	0.8	17	1.1	18	1.8	17
Other	0.2	0.2	0.3	16	0.4	17	0.6	16
Total (rounded)	7.0	8.0	10.0	18	14.0	18	23.0	18

EXHIBIT III-14

French Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	1.7	1.8	1.9	4	2.1	5	2.4	5
Network Services	0.2	0.3	0.4	32	0.6	26	1.2	26
Software Products	2.5	3.1	3.8	23	5.6	22	9.7	21
Professional Services	3.2	3.9	4.7	21	6.9	21	11.5	19
Systems Integration	0.3	0.3	0.4	26	0.6	28	1.2	27
Turnkey Systems	1.0	1.1	1.3	14	1.7	18	3.1	21
Total (rounded)	9.0	11.0	13.0	19	18.0	18	29.0	18

EXHIBIT III-15

French Software and Services Market by Industry Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Manufacturing								
- Discrete	1.9	2.2	2.6	17	3.6	18	5.9	17
- Process	0.6	0.7	0.9	18	1.2	18	2.0	18
Distribution	0.9	1.1	1.3	19	1.8	19	2.9	19
Transportation	0.4	0.5	0.6	19	0.9	18	1.5	19
Utilities	0.4	0.4	0.5	17	0.7	17	1.1	17
Banking & Finance	1.8	2.1	2.5	19	3.5	19	6.0	19
Insurance	0.6	0.7	0.9	19	1.2	19	2.1	20
Government								
- National	0.6	0.8	0.9	17	1.2	17	1.9	17
- Local	0.7	0.8	1.0	17	1.4	18	2.2	17
Services	0.7	0.9	1.0	17	1.4	18	2.2	17
Other	0.3	0.3	0.4	16	0.5	17	0.8	16
Total (rounded)	9.0	11.0	13.0	18	17.0	18	29.0	18

C

Secondary European Markets

The secondary European country market group is defined as consisting of Italy, the Netherlands, Spain, Sweden and Switzerland. For each country market an analysis is provided by principal service mode, as shown in Exhibits III-16 through III-20.

EXHIBIT III-16

Italian Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	0.7	0.8	0.9	8	1.0	8	1.3	8
Network Services	0.1	0.1	0.1	50	0.2	33	0.5	33
Software Products	1.5	1.9	2.3	24	3.6	23	6.4	22
Professional Services	1.3	1.5	1.8	24	2.8	24	5.1	22
Systems Integration	0.1	0.1	0.2	24	0.3	28	0.7	27
Turnkey Systems	0.3	0.4	0.5	14	0.7	17	1.2	20
Total (rounded)	4.0	5.0	6.0	22	9.0	21	15.0	21

EXHIBIT III-17

The Netherlands Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	0.4	0.4	0.4	5	0.4	5	0.5	5
Network Services	0.1	0.1	0.1	30	0.1	21	0.2	21
Software Products	0.5	0.7	0.9	23	1.3	22	2.2	21
Professional Services	0.6	0.7	0.9	29	1.3	20	2.0	18
Systems Integration	0.1	0.1	0.1	29	0.1	25	0.2	24
Turnkey Systems	0.2	0.2	0.3	19	0.5	19	0.8	21
Total (rounded)	2.0	2.0	3.0	18	4.0	17	6.0	17

EXHIBIT III-18

Spanish Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	0.2	0.2	0.2	14	0.3	13	0.4	13
Network Services	*	*	*	33	*	47	0.2	47
Software Products	0.3	0.3	0.4	26	0.7	25	1.3	24
Professional Services	0.2	0.3	0.4	33	0.6	25	1.1	23
Systems Integration	*	*	0.1	42	0.1	26	0.2	25
Turnkey Systems	0.2	0.2	0.3	15	0.4	18	0.7	20
Total (rounded)	1.0	1.0	1.0	23	2.0	23	4.0	23

Note: * refers to figures less than $0.05 billion, but greater than zero

EXHIBIT III-19

Swedish Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	0.4	0.4	0.4	7	0.5	7	0.6	7
Network Services	*	*	*	55	0.1	31	0.2	31
Software Products	0.3	0.3	0.4	24	0.6	23	1.2	22
Professional Services	0.3	0.4	0.5	21	0.7	20	1.1	18
Systems Integration	*	*	*	23	0.1	27	0.1	26
Turnkey Systems	0.2	0.2	0.3	13	0.4	16	0.7	18
Total (rounded)	1.0	1.0	2.0	19	3.0	18	4.0	18

Note: * refers to figures less than $0.05 billion, but greater than zero

EXHIBIT III-20

Swiss Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	0.2	0.2	0.2	7	0.3	7	0.3	7
Network Services	0.1	0.1	0.1	19	0.1	15	0.2	15
Software Products	0.4	0.5	0.6	22	0.8	21	1.4	20
Professional Services	0.3	0.4	0.5	21	0.7	20	1.1	18
Systems Integration	*	*	*	34	0.1	28	0.2	27
Turnkey Systems	0.2	0.2	0.3	15	0.4	17	0.7	19
Total (rounded)	1.0	1.0	2.0	19	2.0	18	4.0	18

Note: * refers to figures less than $0.05 billion, but greater than zero

D

U.S. Market

An overview of the U.S. market for computer software and services is shown in Exhibit III-21, analysed by principal service mode.

EXHIBIT III-21

U.S. Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	16.8	18.8	20.4	10	25.6	12	36.6	12
Network Services	4.9	6.1	8.2	29	11.8	20	20.5	20
Software Products	20.7	25.0	30.3	21	43.5	20	65.4	15
Professional Services	12.7	14.9	17.6	18	23.8	16	34.0	12
Systems Integration	3.8	4.8	5.8	24	8.9	24	17.1	24
Turnkey Systems	8.5	9.4	11.3	15	13.4	10	17.2	9
Total (rounded)	67.0	79.0	93.0	17	127.0	17	192.0	17

E

Japan and Rest of the World

To complete the world picture, an analysis of the Japanese market for computer software and services by principal delivery mode is shown in Exhibit III-22 and for the Rest of the World in Exhibit III-23.

EXHIBIT III-22

Japanese Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	5	5	6	10	7	8	9	11
Network Services	*	1	1	40	1	40	3	35
Software Products	8	10	12	22	18	33	32	21
Professional Services	3	4	4	20	6	30	11	20
Systems Integration	1	1	1	40	2	40	5	35
Turnkey Systems	3	3	4	18	6	18	10	18
Total (rounded)	20	24	28	18	40	20	70	20

Note: * refers to figures less than $0.5 billion, but greater than zero

EXHIBIT III-23

Rest of the World Software and Services Market by Market Sector, 1987-1994

	Market Forecast ($ Billions)							
	1987	1988	1989	1987-1989 CAGR (Percent)	1991	1989-1991 CAGR (Percent)	1994	1991-1994 CAGR (Percent)
Processing Services	1	1	1	15	1	15	2	15
Network Services	*	*	*	22	*	28	1	30
Software Products	4	5	6	26	10	25	19	25
Professional Services	1	1	2	25	3	25	6	25
Systems Integration	*	*	*	25	1	29	1	30
Turnkey Systems	1	1	1	20	1	20	2	20
Total (rounded)	7	8	10	25	16	23	31	25

Note: "Rest of the World" covers all areas excluding Western Europe, U.S. and Japan
* refers to figures less than $0.5 billion, but greater than zero

Trends and Issues

Trends and Issues

The computer software and services business has experienced consistent high growth for some twenty years. It continues to experience high growth (circa 20% per annum), outstripping the computer hardware sector growth rate by a considerable margin. It has thus become an area of focus for equipment suppliers and telecommunications companies as well as independent companies. Additionally, other industries have from time to time bought or attempted to develop business within the software and services industry.

Within the background of this rapidly expanding business two key strategic issues stand out:

- How strong are the industry driving forces and for how long are they likely to sustain this high growth rate?
- Will the nature of the competitive environment change and if so, what types of vendors will predominate in the future market?

These two key issues are discussed in this chapter. Many other important trends and issues are affecting the development of the computer software and services business, for example, productivity, quality and risk management.

A Industry Driving Forces

The fundamental force for change in the computer industry is the phenomenon of rapid technological advance. However, this is not just affecting the particular products and services available for carrying out data processing work, but is also having an impact on the wider business environment. The driving forces of the computer software and services business are discussed below under the headings of:

- Technology
- Information Systems Change
- Environmental Change

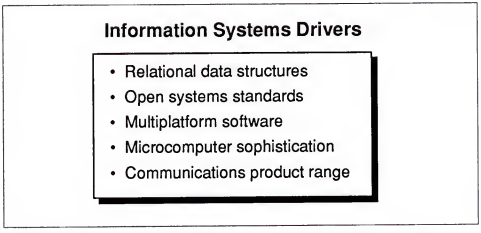
1. Technology

The fundamental driving forces of the computer software and services industry are the rapid development of technology and the continuous advance of its application. The key areas of technology advance can be grouped as:

- Integrated circuit technology development
- Data storage device advances, e.g., CD-ROM
- Advances in telecommunications technology
- The development of sophisticated natural interfaces for information systems input/output

These primary technology advances are creating new systems drivers, the most significant of which are listed in Exhibit IV-1. Relational data structures offer new possibilities for organising and accessing data. Open systems standards and multiplatform software create opportunities to achieve far greater flexibility in the design of information systems, and in the approach to the management of an organisation's information systems investment.

EXHIBIT IV-1



The level of microcomputer sophistication being achieved, in terms of both size and cost, is impelling digital control over an ever-widening set of applications. The advance in the availability of communications products is also a key factor in widening the application of information systems.

These technology advances act as a driving force to systems development, through the following process. At the leading edge, innovative users will adopt new advanced products to the particular needs of their organisation, for example, the innovative and pioneering use by airlines of computer/telecommunication systems for real-time reservation systems. Once some users have clearly established a competitive advantage through such a process, their competitors are largely compelled to fol-

low, and imitators will emerge from other industries. It should, however, be noted that they do not always achieve the same success as the originators. It is also true that in some cases innovative users of new technology fail, and it is the second-wave user that succeeds by learning from the mistakes of the pioneers.

2. Information Systems Change

The rapid technological advance in the computer industry has brought and will continue to bring fundamental changes to the range of computer applications and to the way they are managed. In general we can typify this process of change over the last twenty years as follows:

- From relatively simple standalone systems to highly complex interrelated systems.
- From homogeneous to heterogeneous, in respect to both vendors and types of equipment and software.
- From relatively isolated 'back office' systems applied to discrete areas of an organisation, to systems operating at the front-end and affecting virtually every aspect of the organisation with a need for communication between the different parts.

These changes have had two very powerful effects on the significance of information systems to an organisation. Firstly, they have made these systems indispensable to an organisation's successful and continued operation; today's systems can be described as 'mission critical'. Secondly, they have presented senior executives with the need to strategically manage their application and use.

The information system has become a powerful agent for change in the way that an organisation conducts its affairs, competes with similar organisations and manages itself profitably. The information systems can be so tightly integrated into the operations of an organisation that they become the principal factor in determining the types of services and products that can be provided, particular examples being banks and airlines. There has been much discussion about the gaining of competitive advantage through the application of IT, and doubt has been cast as to how long such a competitive advantage can be sustained. Nevertheless, no organisation today can afford not to achieve parity with its competitors on basic information systems infrastructure.

The needs for senior executives to exercise strategic management of information systems and their development is not a trivial point. Management is such a widely used term in everyday parlance that it is easy to forget its deeper implications. Drucker in his latest book, "The New Realities" argues that it is a relatively new phenomenon. Prior to the

middle of the nineteenth century, the practice of management did not really exist. Organisations were generally very small by today's standards, and work was carried out under the supervision of chargehands. In parallel with this, one can argue that the data processing manager of the 1960s was really a chargehand given the job of running and supervising a particular activity that, apart from the chief financial officer, was not strategically managed by senior executives.

Today, the need for strategic management of information systems investment and development is clear, and we have witnessed the gradual elevation of this function within the user organisation.

At an operational level, the application of new technological developments presents management with considerable challenges:

- The challenge of adopting new technology successfully
- The challenge of integrating different technologies or different computer systems and communications networks

These challenges place heavy demands on the need for key technical skills and project management capabilities that in many cases are just not available within the user organisation.

There is another significant challenge that information systems management must face today that twenty years ago was not a major issue—systems maintenance. As systems have been built up continuously, have become more complex and more interrelated with the enterprise functions, so the task of maintaining them has grown. This has now become a major problem for the in-house information systems department. Professional services firms are beginning to desire substantial revenues from contracting to take responsibility for this function.

Since many existing systems are aging, it also follows that there exists an opportunity to redevelop them. In the future it can be expected that users may turn to outside contractors to help them 'modernise' their existing information systems. Many existing systems remain isolated, not integrated with other systems, inaccessible, out of date and difficult to maintain.

Another allied concept is that of system 'refreshment' in which the vendor, with a long-term commitment to operate and maintain a client's systems, undertakes to hand over at the end systems running on 'state of the art' hardware and software. This is a pro-active operation of the client's system, not a passive operation.

3. Environmental Change

Rapid advances in every aspect of science and technology are having considerable impact upon the overall environment within which all organisations must operate. As has often been commented upon, we now exist within an information-orientated society. Technology advance has made this a widespread phenomenon. This information-oriented environment is creating a more competitive environment; it is changing the way that organisations are structured and is breaking down geographic and other market barriers.

Faster communication allows a more rapid response to consumer actions. This has the effect of increasing competition in markets placing emphasis on the need for more rapid change and development of products, as well as the need to reduce costs and develop more efficient ways of managing the business.

Organisations are consequently seeking to reduce their bureaucratic overhead, shorten their decision structures and time-scales, and of course to utilise information systems to provide the tools for achieving these ends.

A key phenomenon is the emergence of global markets. No longer do geographical and physical limitations restrict the potential of an organisation to its physical base.

Competitive conditions and the search for efficiency demand that producers seek commonality in basic product design and manufacture, but increasingly customise the delivered product, not only to suit ingrained buyer tastes and habits existent in different country markets, but to serve the competitive need to meet emerging niche requirements.

This phenomenon is clearly illustrated by using the paradigm of the automobile industry. It can be observed in this fiercely competitive industry that automobile manufacturers are moving towards the following form:

- They are outsourcing more and more components, and demanding that they be delivered as 'sub-assemblies' and readily assemblable components. Thus in a manufacturing sense, they are becoming systems integrators, taking standard components from which they can build complete systems.

- Their competitive edge, their position relative to competition in the marketplace, is determined by their product design, and marketing capabilities, and offer roles reliability and service image.

Within Europe, other environmental changes of considerable importance are the liberalisation of telecommunications, liberalisation of the financial markets and the Single European Market Initiative (the 1992 phenomenon). Each of these developments is adding further elements of uncertainty to the organisational development plan. In summary, the environment within which organisations must operate today demonstrates:

- A need for rapid change, the capability for shortening the response time scale to meet the challenge of uncertainty
- A new (or renewed) emphasis on quality, product design and customer service as key competitive marketing factors

In order to achieve these objectives, organisational structures are changing, with emphasis switching to smaller companies and an increased use of sub-contractors.

B

Competitive Environment Change

The most obvious change to the competitive environment within the computer industry, compared to 10 years ago, has been the blurring of the boundaries between the different sectors of the industry. Thus it can be observed that we have:

- Traditional Service companies adding products as the basis for developing further service business
- Traditional Product companies adding services to support the further penetration of their products in the marketplace

This change is particularly noticeable amongst larger companies where increasingly their revenues are generated by activities across a number of sectors, for example, systems integration and turnkey systems, software products and professional services and facilities management.

In order to meet these needs, and respond to these changes more quickly than would be possible internally, the market has witnessed a rapid expansion in the areas of:

- Mergers and acquisitions
- Cooperative agreements

Clearly motivated by the need for critical market size in some sectors and geographical coverage in others, a key factor has been the need to acquire or gain access to skill sets and management experience. These are requirements for holding a viable position in these new and different market sectors.

In overall terms the competitive environment has changed and the distinction between products and services has blurred, bringing new and different competitors into contention.

C
Conclusions

The two issues presented at the beginning of this chapter were:

- How strong are the industry driving forces and for how long are they likely to sustain a high growth rate?
- Will the nature of the competitive environment change and if so, what types of vendors will predominate in the future market?

Given the observation that we are facing considerable uncertainty in market development due to rapid change, it is impossible to provide definitive answers. Nevertheless, some clear points do emerge from our analysis that provide a framework for opportunity analysis and action decision.

From the brief description in Section A above, we can conclude that growth in computer services is likely to continue to be strong into the medium term. INPUT believes that the basic forces driving the industry are very powerful. However, it must be anticipated that beyond the next ten years, i.e., by the end of the century, some slackening of that growth will take place simply from the sheer size of the industry in proportion to the overall economy.

The second issue concerned the nature of the competitive environment and the types of vendors that can be expected to take important positions within it. INPUT's principal observation, following the competitive environment change that has already taken place, i.e., a blurring of the service industry sectors, is the continuation of that trend and a consequent increase in competitive activity. In the few areas demanding heavy capital investment, for example systems integration and network services, there will be strong competition between a very limited number of competitors. In other areas there will be continued fragmentation and thus an increase in competitive activity through new vendors entering the market.

We can fairly confidently predict that the competitive environment will continue to change and almost certainly change unpredictably. Vendors that will predominate are likely to polarise into two key groupings:

- A relatively limited number of large vendors (measured by revenue if not by the number of employees)
- A very large and expanding group of medium - small vendors

The first group, large vendors, will be those whose size is determined by the need for large-scale investment (e.g.,. in network infrastructure) or in the need to absorb considerable risk (large-scale complex systems integration). These large vendors will rely increasingly on sub-contracting and joint ventures, commercial alliances, etc., in order to assist in the absorption of risk.

The second group represents the specialists, the niche players, companies that will in many cases have a relatively short half-life. They will experience rapid growth dependent upon their ability to meet particular needs in the marketplace. As those needs change, their revenues will decline, and their staff will migrate to the next wave of growth organisations that have a different approach or different product base more suited to the rapidly changing market requirement. This phenomenon is already visible in the marketplace today.

Vendor Profiles

Vendor Profiles

This chapter contains profiles of computer software and services vendors considered relevant to the study aims. Each profile contains basic data about the company, its products and services and its financial position.

The vendor profiles included in this chapter are listed below:

- SD-Scicon for comparative purposes
- SEMA Group
- Hoskyns
- Logica
- Cap Gemini Sogeti
- GSI
- SLIGOS
- CISI
- DATEV
- SAP
- VOLMAC
- FINSIEL
- Andersen Consulting
- EDS
- CSC
- McDonnell Douglas
- ISTEL
- The BIS Group

SD-SCICON Plc
Centrum House
101-103 Fleet Road
Fleet
Hampshire GU13 8NZ
United Kingdom
Telephone: 0252 622 161
Fax: 0252 616 480

Philip Swinstead - Chairman and Chief Executive
G.W. Holmes - Technical Director
I.M. Scoggins - Marketing Director
W. Wesblow - Deputy Chief Executive

The Company

SD-Scicon was formed in 1988 by a takeover of the far larger SCICON Group, previously owned by BP, by SD (Systems Designers). SD was originally founded in 1969 and obtained flotation on the stock market in 1982. Scicon started operations in 1960 as part of CEIR (Corporation for Economic and Industrial Research)-U.S.A.

SD-Scicon is quoted on the London International Stock Exchange.

The main SD-Scicon shareholders are:

British Aerospace	23.0%
British Aerospace Pension Fund	1.9%
Morgan Grenfell Investment Management (as a discretionary fund manager)	18.1%
Prudential Corporation Plc (partly beneficial owner, partly as discretionary fund manager)	5.9%
Management (approximately)	10.0%

SD-Scicon has the following subsidiary/affiliate companies:

- SD (U.K.)
- Scicon (U.K.)
- GFI (France)
- Bull Scicon Services (France)
- SCS (Germany)
- Systems Control (U.S.)
- Warrington Finance Systems (U.S.)
- Systems Control Technology (U.S.)
- SCICON (U.S.)
- SD Software (U.S.)

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- Vehicle Test Technology Inc. (U.S.) [50% of equity]
- Secure Information Systems Ltd. (U.K.)
  - Joint venture with British Telecom [49% of equity]
- Scicon Holland
- Scicon Italy
- Scicon Belgium

SD-Scicon employed around 5,500 people at the end of 1988, excluding head office staff.

There employees were deployed geographically as follows:

U.K.	2,500
France	1,000
Germany	1,000
U.S.	1,000

Takeovers, Mergers/Sales

April 1989: Sale of artificial intelligence division to a management buy-out team

November 1988: Sale of System Control including Energy Systems Division to Combustion Engineering Inc. for $11.7 million

Key Products and Services

SD-Scicon main activities are

- Consultancy
- Software development
- Software products
- Systems integration
- Facilities management
- Supporting services

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Financial Information

The following is a 5-year summary for SD-Scicon:

FIVE-YEAR FINANCIAL SUMMARY, 1984-1989

	£ MILLIONS					
	1984	1985	1986	1987	1988	1989 6 Months
Revenue - SD-Scicon	30 120	55 145	75 163	83.64 167.36	- -	- -
TOTAL	**150**	**200**	**238**	**251.00**	***221.60**	**141.50**
Profit before tax				7.40	13.40	(1,019)

* *Scicon included from 18.04.1988 (including Scicon for the full year the unaudited total was 274)*

The geographic analysis of SD-Scicon's 1988 revenues is:

U.K.	36.65%
France	15.50%
West Germany	15.65%
Other European Countries	7.30%
TOTAL Europe	74.10%
U.S.	23.25%
Others	2.65%
TOTAL outside Europe	25.90%
Overall TOTAL	100.00%

Industry Analysis

Government Defence Aerospace	29%
Finance - Communications	27%
Industry	24%
Energy	12%
Others	8%
TOTAL	100%

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INPUT has estimated that SD-Scicon generated approximately $344 million of revenues in calendar year 1988 from within the computer software and services industry in Western Europe. The following table shows the analysis of those revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	31	9
Network Services	25	7
Software Products	49	14
Professional Services	139	41
Systems Integration	87	25
Turnkey Systems	13	4
TOTAL	**344**	**100**

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SEMA GROUP Plc
22 Long Acre
London WC2E 9LY
United Kingdom
Tel. No.: 01 - 379 4711
Fax No.: 01 - 240 6778

CEO: P.S.E. Bonelli

The Company

The Sema Group resulted from a merger in 1988 of the French services company Sema Metra and the U.K.-based Cap Group Plc. Both companies had been in operation for 25 years.

Sema Group is a public company listed on the Paris Bourse and the London International Stock Exchange.

The major shareholders are:

Paribas	39.6%
Cap Gemini Sogeti	13.6%
Volmac	4.6%
Union D-Etudes et D'Investissement	4.0%
Jeumont-Schneider	2.7%
TOTAL	100.0%

Sema Group has shareholdings in the following subsidiary/affiliate companies:

Direct Subsidiaries	Proportion Held (Percent)	Country of Registration and Operation
Baddeley Associates Ltd.	100	U.K.
Cap Industry Ltd.	100	U.K.
Cap Information Systems Pte Ltd.	100	Singapore
Data Networks Plc	100	U.K.
Sema Group SA (formerly Sema Metra SA)	98.8	France
Sema Group U.K. Ltd.	100	U.K.

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Indirect Subsidiaries	Propoprtion Held (Percent)	Country of Registration and Operation
Cap Financial Services Ltd.	100	U.K.
Cap Scientific Ltd.	100	U.K.
Computer Projects and Programming (CPP) BV	100	Netherlands
Sema Group GmbH	90	West Germany
Sema Metra Iberica SA	93.33	Spain
Sema Metra Conseil SA	100	France
Sobemap SA	100	Belgium
Sofres SA	100	France
Sofemasa SA	93.33	Spain
SG2 Iberica SA	93.33	Spain
Uniciels SA	49	France
Yard Ltd.	100	U.K.
Yard Software Systems Ltd.	100	U.K.

Sema Group employed 6,502 people on average during 1988.

Staff was approximately distributed as follows:

U.K.	3,100
France	2,000
Spain	750
Belgium	320
West Germany	100
North America	Small Teams
Singapore	N.A.

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Key Products and Services

The four main areas of activity are described below. They account for the following proportions of the company's business:

Facilities management	5%
Market research	9%
Consultancy	12%
Software & systems	74%
• Technical software	29.6%
• Management software	44.4%
TOTAL	100%

1. Facilities Management

The facility management activities are carried out in the main by the subsidiary Data Networks--major contracts include Varity Corporation, Greater Glasgow Health Board, and British Steel Service Centres.

Hardware platforms managed include:

- IBM 3090
- IBM 4361
- DEC
- ICL

2. Market Research

The market research activity in Sema Group is carried out by Sofres in France and subsidiaries in Spain and Belgium. Sofres utilises a panel of 20,000 households (53,000 individuals).

The fields of market research are several, including:

- Political polling (France)
- Television ratings (France)
- Measurements of advertising impact on consumption
- Solid economic analysis trends (France, Spain)
- Business-to-business marketing (Belgium)
- Media market analysis (Belgium)

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3. Consultancy

The consulting activities are spread over several areas:

- Engineering consultancy is carried out by YARD, the main core of whose business is in the defence sector, particularly the naval sector.

- Management consultancy is carried out by Sema Group Management Consultantss (SMC). The areas of activity, both in the private and public sectors are:

  - High technology--strategic directions

  - Basic industries--restructure and innovations

  - International trade and marketing for consumer industries

  - International development, for government and public enterprises

  - Regional development agencies--project identification and monitoring

- Information design consultancy--through Baddeley Associates, Sema Group provides consultancy in information design with the objective of improving their customers' external and internal communications.

4. Software and Systems

The software and systems activities are divided into the following sectors:

- Financial services--among the products and services in this area there are:

  - Card pack--credit card processing service (12 installations in 1988 worldwide)

  - Base 24EFT POS U.K.--communication package for transactions through EFT POS U.K.

  - Branch banking software products

  - Dealing room systems

  - SEB 10 (electronic banking system)

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  - Stock exchange systems for automatic routing, transaction processing and quoting

- Industrial--a variety of products and systems are offered in this area, such as:
  - Handling and invoicing systems
  - Information systems
  - Data acquisition/analysis systems
  - Sales control systems
  - Party control systems
  - Warehouse management systems
- Communications--key products and services in this area are:
  - Project planning
  - Scheduling systems for communications
  - Band II and TN 10 radio telephone networks
  - ISDN (integrated services digital networks)
- Space and defence:
  - Coordination of mission systems avionics
  - Battlefield command/control and communications systems
  - Simulators
  - Space communications software
  - Battlefield presentation display software
  - Graphic measurements processing systems
  - "Concerto" software workbench for communications, space and defence industries

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- Commerce:
  - "Easy" accounting software package
  - Reservation systems
  - Credit management modules
  - Sirius 4000 workstation for interactive production makeup in the publishing industry
- Government:
  - Design and implementation of data processing systems
  - Investment planning control systems
  - Expert systems
- Transport:
  - Signalling control systems
  - Human resources management systems for airlines
  - Car leasing application packages
  - Traffic control systems
- Energy:
  - Maintenance of atomic plants' control systems
  - Reconstruction of information processing equipment
  - Data processing planning for chemico-energy industries

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Financial Information

The following is a 5-year summary for the Sema Group in the period 1985-1988, the year ending on 30th April.

FIVE-YEAR FINANCIAL SUMMARY, 1985-1988

	CURRENCY £ MILLIONS				
	1985	1986	1987	1988	1989 9 Months Ended 31• 12
Revenues					
• CAP	36.5	50.6	78.8	113.1	77.5
• Sema Metra	113.2	140.6	144.6	167.0	84.1
TOTAL	**149.7**	**191.2**	**223.4**	**280.1**	**161.6**
Profits					
• CAP	2.1	2.7	5.8	8.2	(4.9)
• Sema Metra	4.8	6.5	5.9	7.8	7.5
TOTAL	**6.9**	**9.2**	**11.7**	**16.0**	**2.6**

The geographic analysis of Sema Group's 1988 revenues:

U.K.	42%
France	34%
Spain	7%
Belgium	6%
Rest of Europe	5%
TOTAL EUROPE	94%
Asia	1%
North America	2%
Rest of World	3%
TOTAL WORLD	100%

The industry analysis of Sema Group activities:

Financial services	24%
Industrial	21%
Space & defence	15%
Services (commerce)	10%
Government	8%
Energy	8%
Transport	8%
Communications	6%
TOTAL	100%

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INPUT estimates that approximately $343 million of the Sema Group's revenues in calendar year 1988 were generated from within the computer software and services industry within Western Europe. The following table shows the analysis of those revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLION	PERCENT
Processing Services	20	6
Network Services	-	-
Software Products	25	7
Professional Services	218	64
Systems Integration	80	23
Turnkey Systems	-	-
Customer Services	-	-
TOTAL	**343**	**100**

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HOSKYNS
Hoskyns House
130 Shaftesbury Avenue
London W1V 7DN
United Kingdom
Tel. No.: 01 434 2171
Fax No.: 01 437 6223

CEO: Geoff Unwin

The Company

Hoskyns was founded in 1964 by John (later Sir John) Hoskyns, and has been a public company quoted on the international stock exchange since December 1986. Prior to this, the U.S.-based group Martin Marietta Data Systems had owned the company. Only a minority shareholding was made available to the market.

In August 1988, Plessey made an offer to acquire the whole of the issued share capital of the company, and this offer became unconditional in September 1988. In May 1989, an active market in Hoskyns shares was reestablished with the placing of 21.5% of Plessey's shareholding on the open market.

In August 1989, Hoskyns employed 2,500 people.

Mergers and Acquisitions

In the recent past, Hoskyns took control of the following companies:

- CBT--a software house for PC-based programmes
- INSIGHT--a software house operating in the IBM mid-range market
- Elfton Control/Computer Systems--a company specialising in factory automation systems
- Programme Standard Computer Systeme und Programmentwicklungen GmbH--a software company specialising in distribution systems. Programme Standard is also a major distributor of DEC in West Germany.

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Key Products and Services

Hoskyns has three principal areas of activity:

- Systems integration
- Facilities management
- Professional services

1. Systems Integration

For Hoskyns, the term covers the design, development and implementation of computer systems, but over a much wider range of project sizes than those included in INPUT's definition. In 1988 Hoskyns derived £46 million in revenues from this sector (in excess of 40% of Hoskyns' revenues).

2. Facilities Management

Hoskyns claims market leadership in this sector in the U.K.; it generated £43 million in revenues in 1988, representing 39% of total revenues.

3. Professional Services

In this area, providing user organisations with advice, training methods and tools for information technology, Hoskyns generated revenues of £20.7 million in 1988. Hoskyns claims to have over 1,100 consultants, concentrating on strategic consultancy and technical consultancy. An Intelligent Building Service was launched in 1987. Hoskyns is strongly represented in the training sector, in terms of both classroom and CBT-based training. Other important areas are project management, where Hoskyns has the PRISM range of planning, implementation and project management methodologies, and CASE (Computer Aided Systems Engineering) tools. Hoskyns has developed this latter area from the introduction of PMW, a PC-based tool in 1984.

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Financial Information

The following is a five-year summary of Hoskyns' financial performance:

FIVE-YEAR FINANCIAL SUMMARY, 1984-1989

	£ MILLIONS (FINANCIAL YEAR END 31 OCT.)					
	1984	1985	1986	1987	1988	1989*
Revenues	40	56	68	79.2	110.0	87.3
Profit (before Tax)	2.8	3.5	4.5	6.5	9.51	6.71

* *Half year to 30 April 1989*

INPUT estimates that approximately $175 million of Hoskyns' revenues in calendar year 1988 were generated from the computer software and services market within Western Europe. The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLION	PERCENT
Processing Services	68	39
Network Services	-	-
Software Products	8	4
Professional Services	50	29
Systems Integration	-	-
Turnkey Systems	49	28
Customer Services		
Other	-	-
TOTAL	**175**	**100**

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LOGICA plc
64 Newman Street
London W1A 4SE
United Kingdom
+ 44 - 1 - 637 9111

Philip Hughes, Chairman
David Mann, Managing Director

The Company

Logica was founded in 1969.

One of the company's founders was Philip Hughes, the present chairman.

Logica is quoted on the London Stock Exchange.

As of December 31, 1988, Logica had approximately 3,500 employees.

Key Products and Services

The business undertaken by Logica companies includes the following categories:

- The marketing, design, production and maintenance of custom-built software and associated hardware systems
- Consultancy and project management in the field of information technology
- The design, development, implementation and marketing of software products and reusable components of applications software (systems kernels)

About two-thirds of Logica's revenues come from the first category above (i.e., custom systems-software and hardware). The breakdown of Logica's 1988 activities by activity was as follows:

Custom systems	64%
- Hardware	10%
- Software	54%
Consultancy	28%
Systems kernels/products	8%

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The breakdown by market sector was:

Finance	25%
Computing and electronics	17%
Defence	10%
Post and telecommunications	10%
Energy and utilities	9%
Central and local government	8%
Manufacturing	6%
Transport	6%
Broadcasting and media	4%
Space	3%
Other	2%

The following is an analysis of Logica's 1988 revenues by client location:

U.K.	53%
Rest of Europe	26%
North America	10%
Rest of World	11%

Among Logica's software products and kernels are:

- FASTRADE: Trading information systems
- CPLEX 400: Communications software
- GALLERY 2000: Digital picture library
- MASTERCONTROL 2000: Control and data acquisition system

Financial Information

The following is a summary of Logica's financial results for the past five years:

FIVE-YEAR FINANCIAL SUMMARY, 1984-1988

	FOR YEAR ENDED 30 JUNE (£ MILLIONS)				
	1984	1985	1986	1987	1988
Revenues	50.5	62.3	87.0	110.7	132.5
Profit before tax		5.0	6.8	11.3	14.7

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Recent Developments

On 31 March 1988, Logica acquired Data Architects, Inc. in the U.S. at a cost of £25.7 million. The acquired company's activities were merged with those of Logica Systems, Inc. The combined company was renamed Logica Data Architects, Inc.

Business Strategy

The following are recent statements from Logica relating to its general aims and strategy:

"Logica was founded in 1969, and set out to establish high technical standards and achieve a prominent position in its market of high technology consultancy and services. It is a leading independent computer software, consulting and products company with an international capability and reputation."

"Wherever we work, we aim to combine this international outlook with a sensitivity for local culture. We cultivate an environment that encourages excellence and at the same time supports the individuality and creativity needed to meet the challenging requirements of our projects."

"Since its inception in 1969, Logica has consistently pursued a strategy of building an independent, international group, both by establishing its own worldwide subsidiaries and, where desirable by making acquisitions. The excellent growth of the past year, which included a substantial acquisition in the U.S. and further organic growth, is evidence of the success of this well established policy."

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CAP GEMINI SOGETI
6 Boulevard Jean Pain
B.P. 206
38005 Grenoble Cedex
France
+33 - 76 44 82 01

General Management Office
Place de l'Etoile - 11 Rue de Tilsitt
75017 Paris
+33 - 1 - 47 54 50 00

Serge Kampf, Executive Chairman
Philippe Dreyfus, Vice Chairman

The Company

Cap Gemini Sogeti is a public company listed on the Regular (continuous) Market of the French Bourse since July 1987.

The company is organised into three operational groups:

- Cap SESA (France)
- Cap Gemini Europe
- Cap Gemini America

Cap Gemini Sogeti was founded on the 1st January 1975 through the merger of the SOGETI Group, established by Serge Kampf in Grenoble in 1967, CAP and GEMINI a company founded in 1968.

The present ownership of Cap Gemini Sogeti's capital is as follows:

Sogeti S.A.(1)	52%
CGIP (Compagnie Générale d'Industrie et de participations)	12%
Managers	23%
Public	13%

(1) Sogeti S.A. is in turn owned by the managers of Cap Gemini Sogeti (57.5%), CGIP (33.5%), C.F. Sucz (8%) and Lazard Frères (1%)

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Cap Gemini Sogeti employs about 11,500 people, of whom over 5,000 are based in France. More than 2,000 work for Cap Gemini America. The distribution of the 4,000 employees of Cap Gemini Europe is roughly as follows:

West Germany	326
Belgium	231
Spain	125
U.K.	126
Italy	442
Norway	214
Netherlands	1413
Sweden	700
Switzerland	210

The main acquisitions by Cap Gemini in 1987 and 1988 were:

- SESA (France)
- Data Logic (Sweden)
- IBAT (West Germany)
- GE-DA (Italy)
- ITMI (France)

Cap Gemini Sogeti also acquired a 36% share in CISI (France) in 1987, and has built up a significant holding in the rival SEMA Group.

Key Products and Services

Cap Gemini Sogeti offers its clients a wide range of information systems-related services. Its activities are focused mainly around the following areas:

- **Consultancy**

  Consulting services and/or studies prior to the development of IS systems or applications may involve the following areas: IS master plan specifications, advising on methodology, quality-assurance, choice of equipment, software packages or new technologies etc.

- **Implementation of Software Products**

  Cap Gemini Sogeti assists its clients in the implementation and use of products or new techniques and performs specific adaptations, modifications or developments for its clients on program products they are using or that they plan to acquire.

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- **Development of System Software**

  The development of system software includes specifying software functions and their interfaces with existing systems, defining portability and performance criteria writing and debugging programs, conducting tests, editing documentation etc.

- **Development of Application Software**

  The development of application software entails analysing the clients' needs, defining functional specifications, and setting up the team. It involves project management, system analysis, program writing and debugging, editing the documentation, training users, installing the application and formally delivering it to the client.

- **Information Systems Security**

  Ensuring system security and confidentiality involves studying the devices and procedures that provide the physical protection of the facility, the security of files, the control of the access to information, the data encryption (SETH25 system of SESA), the restart of IS centres after accidental interruption etc.

- **Operation of Information Systems Centres**

  Consulting and technical assistance in computer operations cover a wide range of functions from defining the organisational procedures of an IS centre to running of the computer room, including auditing operations, training, consulting and technical assistance in the implementation and use of products. These tasks may finally amount to complete responsibility for operating the IS centre.

- **Information Systems Applications Maintenance**

  Maintaining IS applications refers, on the one hand to consulting activities - help with the implementation of the necessary technical and administrative procedures - on the other, to assistance with the actual maintenance tasks themselves.

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- **Prime Contractor on Large Projects**

  The Group assumes responsibility for the development of complete systems: general specifications, consulting with possible subcontractors, project management and administration, technical coordination, definition of the system architecture, software development and implementation, software and hardware integration, acceptance of the system follow-up and maintenance, etc.

- **Conversions**

  Converting software so that it will operate on a different system (hardware and/or operating systems) requires highly specialized tools and translators.

- **Recruiting of Information Systems Staff**

  The Group assists its customers in analyzing staff requirements and in selecting and recruiting appropriate candidates for the various positions within an IS department. This includes design, development, operations, technical support, maintenance, etc.

- **Training and Seminars**

  Cap Gemini Sogeti provides training to both IS users and IS personnel (managers, development staff, operations staff). Several forms of training are available: seminars, inter-company or single-company classes.

- **Systems Integration**

  Cap Gemini Sogeti may undertake a complete IS solution for a customer by integrating standard hardware and software, or by carrying out specific developments that include responsibility for function, performance and targeted delivery dates.

- **Application Software Products**

  Cap Gemini Sogeti's range of generic or industry-specific application products allows the Group to respond to the users' needs with the following products: Standard Application Modules (SAM) covering the major business applications, MULTITEL videotex monitors, TIGRE software product for interactive securities management, etc.

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- **Development Tools**

  Development support tools feature the MULTIPRO software engineering system, IS systems computerized design tools, INFOLIB (conversion estimating and scheduling tool), along with a complete range of translators.

- **Development Methodology**

  Cap Gemini Sogeti offers its clients software development methodologies that have been developed by its own subsidiaries, and assists them in implementing these products, some of which are supported by the MULTIPRO software engineering system.

- **Design and Realisation of Specific Hardware**

  The Group has, with SESA, capability in the design and development of specialized equipment, bringing together the necessary plant sites and teams noted for the quality of their production of telecommunications frontals (front-ends/interfaces), packet switching equipment, exchange and distribution.

Financial Information

A five-year financial summary of Cap Gemini Sogeti is given below. The distribution of the 1987 revenues among the four operational groups was as follows:

France	31%
Europe	36%
U.S.	19%
SESA (5 months*)	14%

* SESA's results are consolidated by overall integration from August 1, 1987.

CAP GEMINI FINANCIAL SUMMARY

	$ MILLIONS				
	1984	1985	1986	1987	1988
Revenues	303	373	493	701	976
Net profit (after tax)	16	22	32	47	68

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GSI (GÉNÉRALE DE SERVICE INFORMATIQUE)
25 boulevard de l'Amiral-Bruix
75782 Paris Cédex 16
France
+ 33 - 1 - 45 02 74 75

Jacques Raiman, Président
Jacques Bentz, Directeur Général

The Company

GSI was created in 1971 by CGE (Compagnie Générale d'Electricité). It subsequently became a subsidiary of Alcatel-Electronique (part of the CGE group).

In November 1987, the employees of GSI took control of 70% of the shares of the company. More than half of the employees of GSI are now shareholders.

During 1987, GSI acquired a number of small French companies - ASCII, OGL and Erli. GSI also acquired the Gesper software product activity from EDS-SPI.

Key Products and Services

GSI offers its clients a range of professional services, processing and network services, and software products. These are offered through seven different activity areas. The breakdown of the 1987 revenues in these areas is as follows:

Pay and Personnel Management	20.7%
Business Management	17.1%
Motor Trade	10.5%
Transport/Tourism	11.1%
Marketing/Economy	2.7%
Advanced Technologies	16.2%
System Development and Facilities Management	21.7%

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(1) Payroll and Personnel Management

The Payroll and Personnel Management division continues to expand Europe-wide; it has over 350 people looking after over 2,000 customers. Users' meetings are held regularly; GSI also has teams of consultants specialising in designing master plans for very large public and private sector companies.

By marketing the same line of products Europe-wide, GSI offers multinationals compatible information systems.

In 1987, GSI won 150 new contracts - all with companies with more than 5,000 employees.

Agency agreements in different countries give GSI local presence. GSI intends to open an agency in Canada in 1989.

Products:

- *Zadig Progiciel:* With DOS and IMS versions for large IBM systems
- *Zadig MX:* With modules that enable personnel departments to carry out on-site man-power management and planning on a microcomputer
- *Zadig Expert System:* An artificial intelligence-based tool for setting up, maintaining and managing archival/library resources

(2) Business Management

a. Corporate distribution management systems

Distribution management operations went international three years ago, opening in the UK, Belgium and Spain. GSI currently provides integrated solutions to distribution management needs both in Europe and the USA.

(Note: GSI has a partnership with DEC for the Tolas Distribution product which DEC chose to manage its European logistics.)

Product:

- *Tolas Distribution:* GSI successfully installed the product throughout Europe (at companies including Philips, Thomson and Akzo as well as DEC)

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Activity:

- Continues international expansion; now present in France, U.K., Belgium, Spain, Australia as well as the U.S. (Pittsburgh, Boston and Los Angeles).

b. Production control systems

GSI was the first company to offer a "just-in-time" module for computerised production control. The product, **Tolas Production,** has seen a 45% growth in revenue over the previous year.

Geographic presence (France, Belgium, Switzerland) has been increased by the signing of a distribution contract with Sesa for Spain to add to the one signed with Alpi the previous year for Italy.

c. Accounting and financial systems:

Tolas Finance is a package for large systems, whilst **Tolas Finance 36** has been designed for the small- to medium-sized manufacturers. A users group exists with over 80 companies in order to maximise the use of the software.

(3) Motor Trade

This area provides sales information systems for automobile manufacturers and importers, fully integrated management for dealers **(IDS)**, and information exchange between a manufacturer and its network **(DCS).**

GSI's network is composed of over 8,000 dealers in eight European countries.

(Examples: **Dealer Communication System** linking 300 Fiat (France) dealers. Also Hyundai and Lada (UK), Alfa Romeo, Volvo and Peugeot (Holland).)

Renault and Peugeot look upon GSI as a "one source solution" for their respective dealer networks, not only in France, but for the rest of Europe.

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(4) Transport and Tourism

Sesamtel (international hotel reservations), **Vehitel** (car rental), **Telelut** and **Maris** (airline reservations), **Selectel** (administrative and accounting management) and **Voyatel** (travel agencies) present a line of products for travel agents and tour operators.

GSI is a leading specialist in passenger and freight transportation.

a. Passenger travel

- Korean Air uses GSI for its reservation centre in Seoul.
- BSP (Bank Settlement Plan): 5 million tickets processed

b. Freight

Air

- **Fretair** enables freight agents to access the freight reservations systems of British Airways, KLM and Swissair by videotex.

Road

- **Dalog** an internal EDI application, used by Opel (GM) for vehicle delivery around Europe
- Logsped (grouping of road transporters) also uses Dalog.

Rail

- GSI Transport has large contracts with the SNCF (French national rail company).

c. Tourism

- The large travel agents such as Havas, Selectour, Wagons-Lits use GSI for processing.
- GSI has an agreement with GIE Voyatel (15 tour operators) to develop a common reservation system, agreed by Esterel.
- **Vehitel** is used by Avis, Hertz and Europcar.

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(5) Marketing & Economics

In October 1986, GSI acquired a controlling interest in European Automotive Services (EAS) from Chase Econometrics. EAS, which provides economic data for the automobile industry, reinforces GSI's expertise in this field.

The 1984 acquisition of Marketing Systems positions GSI in the front ranks of the European market.

During 1987, GSI rationalised and regrouped CFRO, GSI-ECO, Marketing Systems and GSI-EAS.

Packages available include: **Clotilde** (data analysis), **Dataeco** (processing of historical information), **Forsys** (short-term forecasting), Market (medium/long-term forecasting). **GSI-ECO** provides economic information from a worldwide database with over 1 million economic indicators.

(6) Advanced Technologies

Four distinct units: GSI-Tecsi (France), GSI-Erli (France), GSI-Danet (West Germany), GSI-Tecsidel (Spain).

This sector of the business employs 500 staff members.

Six areas of concentration: Artificial intelligence; telecommunications; real-time manufacturing systems; software engineering; security; information systems architecture.

GSI provides high level consulting in all of these areas as well as systems integration work and expert systems.

(7) System Development and Facilities Management

GSI is a leading network services provider of computerised communications networks that enable companies to exchange documents and retrieve a wide range of critical economic information.

In 1986, GSI installed a network linking together the French government's foreign-based export offices.

The French National Education Ministry asked GSI to create **Edutel**, an internal electronic mail system, with a videotex service centre to transmit news and data to teachers, parents and students. Edutel is currently one of the world's largest videotex service centres.

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GSI-Banque has been working on a number of projects with two French banks, Compagnie Financiere de Suez and the Banque Nationale de Paris (BNP). Revenues in 1987: 195 million francs.

Approximately 70% of GSI's 1987 revenues are derived from its French operations. This proportion has remained relatively constant since 1980.

The following is a detailed breakdown of GSI's employee location by country:

France	62.0%
West Germany	12.6%
United Kingdom	8.7%
Spain	6.5%
Switzerland	3.3%
United States	3.1%
Italy	1.9%
Belgium	1.5%
Netherlands	0.4%

Financial Information

The following is a five-year financial summary of GSI:

FIVE-YEAR FINANCIAL SUMMARY, 1983-1987

	FF MILLIONS				
	1984	1985	1986	1987	1988
Revenues	1,182	1,250	1,295	1,386	1,567
Net Profit	12.2	11.9	13.1	29.3	60.3

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SLIGOS
3 Place de la Pyramide
Cedex 49
92067 Paris La Defense
France
+ 33 - 1 - 4900 9000

Gérard Bauvin, Président Directeur Général
Christian Bret, Directeur Général
Henri Pascaud, Directeur Général

The Company

Sligos is a public company, listed on the Regular (continuous) market of the French Bourse since May 1988.

Sligos was founded in 1972. The present shareholders of the company are:

Crédit Lyonnais	63%
Public	37%

In January 1988, Sligos acquired a majority shareholding in the French company CMG (1987 revenues FF284 million).

Key Products and Services

The activities of Sligos can be divided into four areas:

(1) Monétique (electronic money)

The bulk of this activity consists of the processing of credit card payments. Sligos also undertakes the development of customised payment systems for distributors and other large companies (for example, Sligos recently implemented a point-of-sale system for Shell stations). In addition, Sligos manufactures personalised cheque books.

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(2) Micro-Informatique (microcomputer expertise)

Sligos's activities in this area mainly involve the provision of products and services for small and medium-sized companies and accountants. The following is a breakdown of this sector:

Hardware	41%
Software and service	34%
Accessories	13%
Maintenance	12%

(3) Ingénierie (systems development)

This activity - essentially professional services/systems integration projects - accounts for about 20% of Sligos's revenues. The following is a breakdown of this sector in three industry groups:

Banking/insurance/services/ energy	44%
Industry	40%
Public administration	16%

(4) Télématique (network services)

This fast growing sector is split into two areas--the provision of services for companies (for internal use or for dealing with clients), and public systems (videotex). The breakdown between the two is as follows:

Public/videotex	75%
Private/company services	25%

Financial Information

The following is a five-year financial summary of the Sligos group:

FIVE-YEAR FINANCIAL SUMMARY

	FF MILLIONS				
	1984	1985	1986	1987	1988
Revenues	726	950	1,121	1,397	2,043
Net Profit (after tax)	11.5	22.3	32.3	76.3	98.5

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CISI
31, Avenue de la Division Leclerc
9221 - Fontenay Aux Roses
France
Tel. No.: +33-1-40915000
Fax No.: +33-1-40915050

CEO: Alain Vidard

The Company

CISI was founded in 1972 by CEA, the French Atomic Energy Authority.

In June 1987, the CEA sold 36% of CISI shares to Cap Gemini Sogeti as part of a strategic alliance between CISI and CGS. CISI plans to float its shares on the Paris Stock Exchange in 1991.

CISI has shareholding in the following subsidiary companies:

	Country
CISI Ingénierie	France
CISI Systemes	France
CISI Télématique	France
CISI Tanstec	France
CISI TM Conseil	France
CISI Formation	France
RISL	U.K.
CISI Engineering GmbH	W. Germany
CISI Italia	Italy
SCyT	Spain
CCS	Spain

CISI employed 2,325 people at the end of 1988. The personnel breakdown is as follows (approximately):

Paris area	1,000
Rest of France	750
Europe	600

24% of CISI's revenues are captive, i.e., originated by contracts for the controlling company, the CEA.

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The highlights of CISI activities in 1988 were

- Change of contract with the CEA, from Bureau Services to facilities management. The new contract resulted in revenue loss of FF 120 million.
- Sale of standard software and robotics activities, resulting in a loss of revenue of FF 150 million.
- Growth of 15% in the professional services area.

Professional services now represent over 70% of CISI's revenues.

Key Products and Services

CISI has six principal areas of activity:

1. Scientific and engineering software (CISI Ingénierie)
2. Accounting/administration software (CISI Systemes, CISI Transtec and RISL)
3. Data processing (CISI Télématique)
4. Network engineering (CISI Télématique Conseil)
5. Software packages and turnkey systems for administration (CCS in Spain)
6. Education and training (CISI Formation)

CISI operates on most hardware platforms, including:

- IBM, Bull, Digital, IN2, Goupil, Ultimate, Tandem, Sun, Matra Datasysteme, NCR and Unisys

It uses the following languages:

- Cobol, Pascal, C, ADA, APL, PLI, LISP

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Financial Information

The following is a three-year summary of CISI:

THREE-YEAR FINANCIAL SUMMARY, 1986-1989

	CURRENCY (FF MILLIONS)			
	1986	1987	1988	1989 (est.)
Total Revenues	1,538.30	1,180.00	1,108.00	1,150.00
Foreign Revenues	N/A	N/A	276.00	340.00
Net Profit	2.0	(20.00)	33.00	>50.00

The geographic analysis of CISI's 1988 revenues is:

Paris area	30%
Rest of France	45%
Foreign	25%
TOTAL	100%

CISI operates in the following specialist markets:

- Space/aeronautics
- Telecommunications
- Defence
- Nuclear energy
- Earth resources
- Transportation

INPUT estimates that approximately $168 million of CISI's revenues in calendar year 1988 were generated from the computer software and services market within Western Europe. The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	30	18
Network Services	-	-
Software Products	3	2
Professional Services	120	71
Systems Integration	-	-
Turnkey Systems	15	9
Customer Services	-	-
TOTAL	**168**	**100**

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DATEV eG
Siegmund Str.
8500 - Numberg 80
West Germany
Tel. No.: +49 911 276 3257
Fax No.: +49 911 276 3202

The Company

DATEV was founded in 1966. It is a cooperative society, working as a professional service centre for members of the tax consulting profession.

DATEV has no subsidiaries and does not provide services for anyone outside of the cooperative, nor does it offer data transfer services between members of the cooperative.

It employed 3,000 people in July 1989.

Key Products and Services

DATEV has two principal areas of activity:

- Data processing and services
- Software development

DATEV has 26 data processing centres in West Germany. The equipment platforms used are

- 1 IBM 3090/400
- 1 IBM 3084-Q
- 2 Siemens 7.890-Ss
- 24 IBM 3420s

The company's services include

- Accounting
- Payroll
- Taxation

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DATEV offers database facilities for the following fields:

- Economic measurement
- Tax legislation
- Commercial legislation (DATEV-LEX Inform)

Financial Information

The following is a two-year summary of DATEV's financial operations:

DATEV TWO-YEAR FINANCIAL SUMMARY

	1987	1988
Revenues (DM millions)	453	502
Growth Rate (Percent)		11

100% of DATEV's revenues are generated within the West German market.

INPUT estimates that approximately $260 million of DATEV's revenues in calendar year 1988 were generated from the computer software and services market within Western Europe. The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	200	77
Network Services	-	-
Software Products	40	15
Professional Services	20	8
Systems Integration	-	-
Turnkey Systems	-	-
Customer Services	-	-
TOTAL	**260**	**100**

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COMPANY PROFILE

SAP AE
Max-Planck Strasse 8
D-6909 Walldorf
West Germany
Tel. No.: 49 6227/34 0
Fax No.: 49 6227/34 - 282

Directors:
D. Hopp
H. Plattner
K. Tschira
H-W. Hector

The Company

SAP was founded in 1972 by its four directors.

Although the company is public, 80% of the shares are owned by the directors.

SAP has shareholdings in the following subsidiary/affiliate companies:

SAP Consulting GmbH	50%
TOS GmbH	60%

In August 1989, SAP employed 1,100 people.

Mergers and Acquisitions

SAP acquired TOS GmbH, Freiberg in 1988 (60% of shareholding).

Also in 1988, SAP entered into a joint venture with Arthur Andersen, resulting in SAP Consulting GmbH (50% SAP, 50% Arthur Andersen).

Key Products and Services

SAP AG has three principal areas of activity:

1. Application software
2. Training
3. Consulting

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SAP's products and services are sold under the following names:

- RV Sales
- RM PPS Production
- RM MAT Materi

SAP sells its software products on IBM and Siemens hardware, and plans to launch UNIX versions in the early 1990s. SAP has produced versions of its software in six different European languages. By using SAP's data dictionary, users can switch between languages in the same session.

Prices for their software products range from DM 100,000 to DM 1,000,000.

Financial Information

The following is a five-year summary of SAP:

FIVE-YEAR FINANCIAL SUMMARY, 1984-1988

	DM MILLIONS				
	1984	1985	1986	1987	1988
Revenues	48	61.2	102	152	245
Profit (before tax)	7.9	8.1	22.9	31.6	44.5

The geographic analysis of SAP's 1988 revenues is

Germany	69%
Exports	31%
TOTAL	100%

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INPUT estimates that approximately $127 million of SAP's revenues in calendar year 1988 were generated from the computer software and services market within Western Europe. The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	-	-
Network Services	-	-
Software Products	86	68
Professional Services	36	28
Systems Integration	-	-
Turnkey Systems	5	4
Customer Services	-	-
TOTAL	**127**	**100**

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VOLMAC
Catharijnesingel 30-33
P.O. Box 2575
3500 GN Utrecht
Netherlands
Tel. No.: +31 30 324911
Fax No.: +31 30 324433

Chairman: G.G. Dohem

The Company

VOLMAC was founded in 1966 by Mr. J.C.L. Mol and Mr. van Oosterom.

The company is privately owned, with the major shareholders being DIOSMO (15%), the employees (14%), institutional investors (30%), and CGS Group (5%).

As of March 1989, the company had 2,569 employees.

The group consists of 19 companies and 2 associates, controlled by a holding company. The companies are independent units operating under strategic guidelines.

Mergers and Acquisitions

The company has been operating a long-term strategy of external growth, both in the Dutch and foreign markets.

Volmac Software obtained listing on the Amsterdam Stock Exchange in 1988, and in November 1988 it launched a venture capital fund (World Software Group) to acquire strategic stakes in software companies worldwide.

Key Products and Services

VOLMAC specialises in supplying professional services such as consultancy, education, training, and development of customised software for complex systems (95% of activities).

The packaged software sector is currently less than 5% of the total activities but it will be expanded in the future.

The following is a description of the main companies in the group and the services they provide.

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VOLMAC Nederland

- The services provided by the four companies jointly operating under the name Volmac Nederland cover the entire spectrum of information technology. Their clients are mainly medium-sized and large companies, institutions and public authorities. These services include

  - Advising and supporting organisations in formulating and implementing information and automation strategies (VOLMAC ADVIES)

  - Designing and developing custom systems (AUTOMATION CENTRE VOLMAC)

  - Developing and conducting technical training courses, workshops, etc. (VOLMAC TOPTRAINING)

  - Specialist services in the field of information technology and networks (VOLMAC SYSTEMS & NETWORKS)

Interprogram specialises in designing, developing and installing systems either at a fixed price per "functional point" or on a time and materials basis. One of Interprogram's own products is Blues, a system development software tool. Its subsidiary, Software Control, is active in the field of EDP audit and quality control.

Gimbrere & Dohmen Software provides expertise and assistance in the development of administrative and commercial systems in the public and private sectors.

ADEPT Nederland offers complete solutions using the K2* business information system, based on Oracle. ADEPT's other main activities include staff agency services, training, and the supply and installation of personal computers and networks.

SOVAC AUTOMATISERING specialises in computer applications for the social security and health care sectors.

BRAINFORCE advises and assists clients in formulating and implementing their information and data management systems.

DATAPROCESS Belgium specialises in mainframe and personal computer software companies, among others for financial institutions and industry, as well as providing consultancy services.

CONSOLE supplies software packages and custom software and training, concentrating mainly in the distribution sector.

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VOLMAC SOFTWARE & TRAINING (Belgium) services the Belgian market with the same range of services as does VOLMAC Nederland on the Dutch market.

INSURANCE SYSTEMS NEDERLAND supports the insurance industry. It provides consultancy services, supplies software packages, installs custom systems and gives training and support.

PROFIX develops systems, mainly of fixed price/fixed date terms, and provides training for personal computer users.

TWINAC SOFTWARE develops software mainly intended for the banking and industrial sectors and for Tandem computers.

DESISCO is a consultancy and software bureau and a computer training institute, for both public and private sector organisations, specialising in mid-range systems.

SNA Consultants specialises in communication systems and network structures based on IBM's SNA and SAA concepts.

VOLMAC MARKETING & MANAGEMENT provides interim and longer-term management and consultancy services for group companies.

VOLMAC ASSURANTIEN provides services and advice for group companies and their staff on mortgages, insurance, pension, finance, and property transactions.

Financial Information

The following is a five-year summary of Volmac's financial operations:

FIVE-YEAR FINANCIAL SUMMARY, 1985-1988

	FISCAL YEARS ($ MILLIONS)				
	1984	1985	1986	1987	1988
Revenues	95	135	180	216	259
Profits (before tax)	20	28	39	47	58

Aound 86% of the revenues are derived from the Dutch market, the remainder largely from Belgium.

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The following table shows the analysis of VOLMAC's revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	-	-
Network Services	-	-
Software Products	13	5
Professional Services	246	95
Systems Integration	-	-
Turnkey Systems	-	-
Customer Services	-	-
TOTAL	**259**	**100**

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FINSIEL SpA
Via Isonzo 21/B
00198 - Roma
Italy
Tel. No.: +39 6 84311/851505

MD: Dott. Vittorio Salvati
Strategic Planning
Director: Ing. Sergio Utili

The Company

The Finsiel Group was started in 1969 as ITALSIEL; in 1981 the Group was organised in a holding structure and the Finsiel name was introduced.

Finsiel is owned by the Italian State via IRI (83% of shares) and Banca d'Italia (17% of shares).

IRI is the holding company for the very large group of companies owned by the State in Italy; Banca d'Italia is the central bank.

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In December 1988, the Group was based on 15 companies:

NAME	SHAREHOLDERS	PERCENT
ITALSIEL	IRI Finsiel	50.3 16.4
Informatica Friuli-Venezia Giulia	Finsiel	52.0
I C Soft	Finsiel	100.0
Sibi	Finsiel	35.0
Netsiel	Finsiel Italsiel	40.0 60.0
Datasiel	Finsiel	49.0
Intersiel	Finsiel	50.0
Softsiel (U.S.)	Finsiel Tecsiel Italsiel I C Soft	15.0 55.0 15.0 15.0
Sogei	Finsiel	100.0
Tecsiel	Finsiel Italsiel Sogei	40.0 30.0 30.0
Informatica Trentina	Finsiel	41.0
Agrisiel	Finsiel	49.0
G.I. Informatica	Finsiel	40.0

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The Finsiel Group also has shareholding in the following companies:

NAME	CAPITAL (Lira Billions)	SHAREHOLDING (Percent)
Telesoft	9.0	40.0
Data Management	13.0	29.0
Sistemi e Telematica Porto di Genova	0.5	5.0
Castalia	5.0	5.0
Ancifap	26.7	0.2

Furthermore, the following companies within the Finsiel Group have shareholding in the following companies:

COMPANY	CAPITAL	SHAREHOLDING	PERCENT
Saped	1.0	Italsiel	20.0
Sit	0.2	Informatica Friuli - Venezia Giulia	10.0
Edindustria	0.2	Italsiel	9.5
Bic Napoli	1.0	I C Soft	7.0

Finsiel also launched a joint venture with SIP-STET (Italian Telecoms) called TELESOFT, with the purpose of developing telecommunications software for the Italian system. Finsiel controls 40% of the shares and forecasts Telesoft to have over 1,000 employees and L 100 billion turnover by the end of 1991.

In April 1989, Finsiel had 4,900 employees; it had hired 800 new employees during 1988.

Strategy

Expansion is carried out through the formation of joint ventures with customers. Once the company is established, it is then moved from providing services to the original customer to the general market.

Finsiel invests over 15% of its revenues in R&D and in training of its own personnel.

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The recent drive for expansion by Finsiel from the government's market into the private one is considered one of the major factors leading to the recent major changes in the Italian IS industry.

Main Activities

The main activities of the Finsiel Group are, in order of importance:

- Design, development and implementation of information systems, mainly for public authorities
- Facilities management
- Consulting services
- Training and education

or, according to INPUT's breakdown:

Processing services	47.8%
Software products	4.2%
Professional services	47.5%
System integration	0.5%
TOTAL	100.0%

The processing services category includes a percentage of network services that could not be quantified. System integration includes a very minimal percentage of the turnkey market.

Revenue Sources

Finsiel revenues are originated by the following vertical markets:

Central government	60%
Local authorities	15%
Discrete manufacturing	10%
Banking	8%
Others	7%
TOTAL	100%

Geographically, the majority of Finsiel revenues are originated in Italy (over 95%).

In October 1988, Finsiel signed an agreement of cooperation for software development and education in the U.S.S.R.; contacts are now being developed for possible expansion in the Cyprus and Spain markets (central governments' supply).

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Finsiel is also active in the U.S. market with its subsidiary Softsiel, which supports software systems products that are commercialised by distributors.

Financial Information

THREE-YEAR FINANCIAL SUMMARY, 1986-1988

	FISCAL YEAR (LIRA BILLIONS)		
	1986	1987	1988
Revenues	455	575	699
Profits (before tax)	N/A	*50	66

* *Approximate figure*

INPUT estimates that approximately $470 million of Finsiel's revenues in calendar year 1988 were generated from the computer software and services market within Western Europe. The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	225	48
Network Services	-	-
Software Products	20	4
Professional Services	225	48
Systems Integration	-	-
Turnkey Systems	-	-
Customer Services	-	-
TOTAL	**470**	**100**

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ANDERSEN CONSULTING
69 W. Washington Street
Chicago, IL 60602
United States
(312) 580-0069

Andersen Consulting--European HQ
2, Arundel Street
London WC2R 3LT
United Kingdom
Tel. No.: +44 - 1 836 1200
Fax No.: +44 - 1 831 1133

Don Hanson, Managing Partner, U.K.
Mel Bergstein, Management Information Consulting Division
Iain Stitt, 1992 Director

The Company

Arthur Andersen entered into the information services business in 1952. It is a private partnership company.

It is divided into four main divisions:

- Accountancy and audit
- Management consultancy
- Tax consultancy
- Software products

It employs 32,000 people worldwide for all company activities, plus some 2,000 partners. The company operates in 52 countries. In Europe, it employs some 8,500 professional staff, plus 400 partners. Arthur Andersen is the leading company providing audit and management consultancy in several European countries, including Italy and Spain.

Arthur Andersen established a separate company, Andersen Consulting, to handle all its information services business.

In June 1989, Andersen Consulting acquired the Norwegian software products vendor, Computer Management, which had a revenue of $5 million and 30 staff. Its main product was an IBM system software product that improves the economy of computing operations by defining the level of service and adjusting resources accordingly.

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Key Products and Services

Andersen Consulting has three principal areas of activity in the information services business:

- Systems integration
- Consultancy
- Software products and related professional services

Andersen Consulting is the largest independent commercial systems integration vendor in Western Europe. In 1988, INPUT estimated that its systems integration revenues grew from $100 million in 1987 to $155 million in 1988.

The company's consultancy services are based around five advanced systems centres. These are large IBM computer facilities. Project teams use workstations connected to these centres for the automation of bespoke applications development for each client. These professional services are estimated to have grown in 1988 from $70 million in 1987 to $105 million in 1988.

The company has targeted the manufacturing sector with its software products. These are sold independently from its consulting business. Its software products activities can be divided into two main areas:

- CASE
- Integrated manufacturing solutions

Andersen Consulting has developed a range of CASE tools. They were initially used internally by their IS consultants, then launched on the open market under the name Foundation. This range consists of:

- Method/1
- Design/1
- Install/1

Its integrated manufacturing solutions are the MAC-PAC range of products. These provide the end user with a fully integrated manufacturing, distribution and financial applications solution. Arthur Andersen is an IBM agent, and works with IBM in delivering a complete package to end users.

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The MAC-PAC product range consists of:

- MAC-PAC for Systems 38 and AS/400
- MAC-PAC JIT for IBM mainframes
- MAC-PAC D for IBM mainframes

Andersen Consulting also has developed the software product DCS Logistics. Its software products revenues are estimated by INPUT to have grown in 1988 by 50%, from $10 million in 1987 to $15 million in 1988.

Andersen Consulting delivers its own application software, plus customization where needed, and associated professional services, such as training and consultancy. IBM delivers and supports the equipment, retaining it under the IBM title.

Financial Information

The following is a three-year summary of Andersen Consulting revenues in Western Europe:

THREE-YEAR FINANCIAL SUMMARY, 1986-1988

	FISCAL YEAR		
	1986	1987	1988
Total revenue ($ Millions)	100	180	280
Annual growth rates (Percent)		80	56

A breakdown by country for 1988 is as follows:

	1988
U.K.	28%
France	19%
Italy	18%
West Germany	10%
Rest of Europe	25%
TOTAL	100%

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The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	-	-
Network Services	-	-
Software Products	15	5
Professional Services	105	38
Systems Integration	155	55
Turnkey Systems	5	2
Customer Services	-	-
TOTAL	**280**	**100**

The attached INPUT Research Bulletin, produced in 1988, provides insights into Andersen Consulting's business mission.

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Research Bulletin INPUT

1280 Villa Street, Mountain View, CA 94041-1194 (415) 961-3300
Telex 171407 Fax (415) 961-3966

ARTHUR ANDERSEN & COMPANY
PROFESSIONAL SERVICES MISSION

September, 1988

Arthur Andersen & Company is enjoying a phenomenally rapid growth in its Management Information Consulting (MIC) practice. It now has an annual revenue "run rate" of $1.4 billion in information related professional services. Billable hours in the U.S. for its first quarter of fiscal year 1988 (ending November 31, 1987) were up 27% and this rate has continued through the second quarter. Growth outside of the U.S. is even higher in billings, in the 35% - 45% range. AA & Co. is establishing itself as the leader in empowering organizations to effectively apply technology to their business advantage.

AA & Co. emphasizes intake of high-performing graduates directly from college. Many come from top colleges and graduate schools such as Harvard, the University of Chicago, and Stanford. About one-half of the intake has a technical degree in engineering or computer science. These new hires are put through an intensive training program and then given continued formal and on-the-job training. AA & Co. estimates it spends over $6,000 per year per person on education and training. This is actual cost not including lost opportunity cost. This training, along with their methodologies and tools, ensures consistent quality across projects throughout the world.

The general attitude of AA & Co. staff is very positive and aggressive. They are committed to on-time delivery of solutions to satisfy client needs. They are a bunch of hungry, bright people. An anecdote illustrates this.

> In February, on a cold, snowy Chicago evening, over 200 of their Chicago-based consultants voluntarily attended a meeting on their new CASE tool, FOUNDATION. The two hour meeting included presentations by AA & Co.'s technical, client service, and software marketing personnel on AA & Co. products and strategy in marketing a complete and integrated set of CASE tools. These meetings are held monthly and are very well attended. The Chicago office is their largest MIC office with over 1,000 consultants.

AA & Co. has 226 offices in 49 countries, with 81 in the U.S.

In terms of human resources, their biggest concern is that they did not hire enough people last year. Their total number of MIC professionals is over 13,000.

Industry Market emphasis for AA & Co. in the U.S. is as follows: Manufacturing, Telecommunications, Financial Services, State and Local Government, and the Federal Government. To this point they have been relatively weak in the Federal Government but are moving to strengthen their position. These industries have been chosen because of their attractiveness based on their size, technology employed, market image, available alliances, AA & Co.'s current position, and (for government) counter-cyclical economics.

For top companies in these and other key industries, full-time marketing teams have been established to penetrate the accounts and build long term relationships. The account teams are targeting mission critical opportunities with high information content, high quality requirements, and tight implementation schedules.

AA & Co.'s strategic services are a key vehicle for establishing early, high level entre into the target company. It supports AA & Co. in establishing business process change as a key value for buyers of Systems Integration.

A key feature of AA & Co. is its organization. Unlike other accounting firms, the consulting division has its own organization separate from the audit and tax structure. Thus, each of the AA & Co. offices has a managing partner in charge of MIC who reports through a regional organization to a country managing partner. This organization was put into place last year and has three major benefits for AA & Co.

- It reduces the audit/tax and MIC potential for conflict by giving the MIC group freedom from an operational and marketing perspective.
- It increases the size of the resource pools that can be tapped for client projects.
- It puts the organization into a structure that can easily be "spun-off" if the SEC or Congress so demands, or if AA & Co. chooses to do so. There is no current evidence that such a move is planned by AA & Co.

AA & Co. operates five Advanced Systems Centers which are large IBM computer facilities staffed with technical experts and project managers. Project teams use workstations connected to these centers for the automation of the application development process for each client. Thus, at least part of the development is done on AA & Co.'s computers, not the client's.

Associated with the Advanced Systems Centers are Advanced Technology Centers. These centers specialize in industry and function specific technology. Each has a working demonstration of the technology, e.g., a factory floor (at INFOMART in Dallas) or Engineering Design Department (London). The Technology Centers act as sites for AA & Co. R&D and training, and client Systems Integration projects and education. Additional Technology Centers are planned for the capital markets, insurance, and health care industries.

The Advanced Systems Centers, Advanced Technology Centers, and other software development sites will be linked together by a global voice and data communications network. The network management center will also serve as a client demonstration site.

Another organizational feature of AA & Co. is its strong staff function. A central Technical Services Organization (TSO) has about 500 people charged with keeping the worldwide organization at the forefront of information technology. Included within this unit are the development, maintenance, and support staff for the software products that AA & Co. sells. Product marketing directors are located in the major offices for client promotion and education in our software products. These software products include:

- MAC-PAC
- DCS
- FOUNDATION

The MAC-PAC software products provide manufacturing systems on IBM System/370 and System/38 computers. MAC-PAC/J.I.T. has been added which supports real-time communication with a CIM network. MAC-PAC has been particularly targeted for installation at defense contractors. It also supports both materials requirements planning and just-in-time techniques in an integrated environment.

DCS (Distribution Control System) gives comprehensive coverage of the distribution business cycle: order entry, billing, inventory control, warehouse management, outbound logistics, distribution requirements planning, purchasing, accounts receivable, and marketing information. It is the most widely installed mainframe product in the world. Its systems architecture provides it with significant flexibility through a customization facility and the capability for real-time integration of other hardware and software.

FOUNDATION is an integrated, automated software development environment designed to support the entire life cycle of application software development. Three software packages are included: Method/1, Design/1, and Install/1. Method/1 is a PC-based automated methodology with a fully integrated set of project management tools. Design/1 is a PC-based set of design tools including data flow diagrammers, prototyping capability, and screen and report painters, all using a LAN-based design repository. Install/1 is a mainframe-based code generator including test data management facilities and a fully extensible production data repository for DB2.

Other field functions coordinated by TSO are artificial intelligence and telecommunications centers of expertise. These are central "pools" which are used to support particular client projects.

TSO also operates a software intelligence group which has the following responsibilities:

- Gathering, evaluating, and disseminating comprehensive and up-to-date information on application software products and vendors.

- Working closely with software vendors to enhance their existing products by providing improved features and functions benefitting our clients.

- Informing firm personnel of new application software products, enhancements to existing products, and software industry trends.

- Monitoring software vendors and their products to alert firm personnel to major problems that can develop when implementing and using specific application software packages.

- Helping clients benefit from the most current knowledge and most recent "hands-on" experiences of professional personnel who have worked with and have an in-depth understanding of the capabilities of packaged software products.

- Supporting information professionals on client engagements by providing application software advice and technical assistance.

- Developing methodologies and tools to help ensure successful implementation of application software-based systems.

This software intelligence group has implemented a number of relationships with software products companies through the OASIS program. This program provides AA & Co. with in-depth knowledge of the products of key software companies such as MSA, SAP, and McCormack & Dodge. AA & Co. works on major projects implementing these software products.

Industry specialization, however, is not provided as a centralized staff function. AA & Co. partners and managers in the field with particular expertise and knowledge are assigned responsibility for developing and maintaining the firm's competence in particular industries. They are responsible for communicating new ideas and developments in each industry to all appropriate members of the organization. They plan and conduct seminars and serve as the primary sources for the development of on-going industry training programs. For example, a partner in their Atlanta, Georgia office has worldwide responsibility for building their practice in the telecommunications industry. He works with a core group of telecommunications industry partners from offices around the world. Each core group partner sells work in the industry and maintains a local base of employees knowledgeable in the industry.

These are also functional specialization groups concentrating in major business functions. Again, these groups are formed of line partners. Each core group identifies emerging business needs in its specialization and facilitates the development and delivery of services meeting those needs. Advice and information for promotions and engagements are provided to other firm staff as needed. Engineering is an example. It is headed by a Dallas partner who reports to the New York partner with overall responsibility for all of Operation Management. He is assisted by functional coordinators specializing in areas such as CAD/CAM/CAE, hardware integration, configuration management, engineering productivity, and automated mapping/facilities management.

The geographical organization is overlaid with the industry, functional, and software specialists. The overlay organizations are embedded in the field organization. This concept is a very strong and unique one. It ensures there is real-world contact by the specialist areas.

One particular strength being built is the support of Systems Integration, particularly in manufacturing. In just two years AA & Co. has established itself as the premier

CIM and manufacturing Systems Integration company primarily through a bold and innovative marketing plan, highlighted by the IMPACT exhibit.

In 1986, the IMPACT exhibit first made its appearance at the AMS show in Chicago. It was a fully integrated mini-factory occupying about 12,000 square feet and including equipment from about ten manufacturers. In 1987 it had expanded to 24,000 square feet with fifteen leading suppliers: it included over $18 million of hardware and software from IBM, Allen-Bradley, INTEL, Intergraph, and others.

The power of the exhibit was that executives from manufacturers can actually see CIM in action. The first year alone generated $7 million of orders for AA & Co. - over 100 of the chief executives from the top FORTUNE companies visited the exhibit in the first year.

The exhibit, expanded and with new technology, forms the core of one of AA & Co.'s Advanced Technology Centers. It has now been permanently sited at Northwestern University in Evanston, Illinois. The Center is part of the Basic Industry Research Laboratory and is actively connected to the research efforts of the University.

This is part of an aggressive promotional move by the firm. AA & Co. considers that the 1990's will bring a period of rapid consolidation in the industry and that it must get a critical position in order to be one of the surviving key players. As a result they are investing in an overall marketing program including public relations, seminars, and other promotional activities.

A major thrust in their promotion is to position the firm as the premier commercial systems integrator. They believe they have the objectivity and skills to be a unique provider of these services. They cite four reasons for being in it:

- Synergy - their existing engagements lead them into it.
- Culture - AA & Co. has a delivery orientation.
- Resources - their size and staff capabilities allow them to perform, plus they have the project management disciplines necessary.
- Demand - their customers are asking for it.

AA & Co.'s other major service lines, strategic services and education consulting directed to change management, complement and support the central Systems Integration thrust. Each service line has dedicated sales personnel and resource pools. Strategic services assists clients to gain competitive advantage through technology and other means. Change management makes the organization and work group changes to ensure successful absorption of the new technology by the company.

In summary, AA & Co. has a vision of where it wants to go and is building the organization, tools, and methods to make it happen. Its strong field operation is supported by an effective staff and excellent education and training facilities. Its growth rate should continue at a 25% to 30% rate for at least the next five years.

ELECTRONIC DATA SYSTEMS CORPORATION
International Headquarters
Devonshire House
Mayfair Place
London W1X 5FH
United Kingdom
Tel. No.: (01) 499 9588
Fax No.: (01) 499 8526

Clyde Ziegler, Managing Director, International Division
John Beach, Director of Sales and Marketing

The Company

Electronic Data Systems Corporation (EDS), founded in 1962, is a leading information and communications services company providing information processing, systems management and communications services internationally.

- EDS currently has more than 6,000 clients in 27 countries worldwide.
- EDS' largest client is General Motors Corporation (GM) and its subsidiaries, which contributed approximately 59% ($2.8 billion) to EDS' 1988 revenue.

EDS and its subsidiaries were acquired by GM in October 1984 for approximately $2.5 billion.

- The acquisition was consummated through an offer to exchange EDS common stock for either $44 in cash or $35.20 in cash plus two-tenths of a share of Class E common stock, plus a nontransferable contingent promissory note issued by GM.
- EDS operates as an independent subsidiary of GM. EDS' performance forms the base from which any dividend on the GM Class E common stock will be declared. These earnings include income earned from services provided to GM and its other subsidiaries.
- Through its work for GM, EDS has gained expertise in factory automation, strengthened its international presence and enhanced its communications expertise.

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The international operations of EDS were established in 1974 and are run from London. They were largely formed out of the merger of UCSL, acquired from Unilever of the U.K., and SPI, acquired from Pechniney of France.

Recent acquisitions made by EDS include the following:

- In May 1989, EDS and Hitachi Ltd. announced the completion of their acquisition of National Advanced Systems Corporation (NAS) from National Semiconductor Corporation. EDS and Hitachi have formed a new, independently operated joint venture company, Hitachi Data Systems Corp., which will market and distribute Hitachi PCM mainframe and peripheral equipment. EDS holds a 20% equity in the new venture.

- In April 1989, EDS acquired BancSystems Association Inc. (Westlake, OH), a subsidiary of Society Corporation that provides credit card transaction processing services to the financial services industry. Terms of the purchase were not disclosed.

  - BancSystems, founded in 1969 as a not-for-profit association owned by the member institutions that used its services, was acquired by Society Corporation in 1984.

  - BancSystems provides MasterCard and Visa credit and debit processing and related services to more than 180 financial institutions in Ohio and seven other states with more than 2.4 million cardholders and 38,000 merchants.

  - BancSystems had approximately 300 employees at the time of the acquisition. Its operations have been merged into EDS' Financial Industry Group.

  - EDS will continue to operate out of BancSystems' Westlake offices, where it will continue to perform credit card processing for Society Corporation's affiliate banks, other BancSystems customers and the expanded national business it expects to obtain.

- In April 1989, EDS acquired the electronic funds transfer (EFT) business of Automatic Data Processing Inc. (ADP). Terms of the acquisition were not disclosed.

  - ADP's EFT business includes a range of services for automatic teller machines and point-of-sale applications for the banking industry.

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- Headquartered in Clifton (NJ), ADP's EFT operations employ nearly 300 people and supply one of the largest networks in the industry.

- EDS' most significant acquisition during 1988 was made in April when the company acquired MTech Corp. of Dallas (TX) for approximately £347 million. The acquisition was accounted for as a purchase.

  - MTech stockholders had the option to receive $30 in cash or $13 in cash plus one-third share of GM Class E common stock with a Limited Guarantee for each share of MTech stock.

  - MTech operates the third-largest ATM network in the U.S. and handles the data processing for more than 1,100 financial customers nationwide.

  - MTech had approximately 3,300 employees at the time of the acquisition and 1987 revenue of $232.1 million. EDS expected MTech's business to generate $190 million in revenue for 1988.

  - The operations of MTech have been merged into EDS' Financial Industry Group.

- In November 1988, EDS acquired VideoStar Connections Inc., an Atlanta-based company specializing in private satellite broadcasting services and special-event videoconferencing and VideoStar's staging services subsidiary, Staging Connections. Terms of the purchase were not disclosed.

  - VideoStar operates 17 private television networks and 1,800 downlinks. The networks are ideal for businesses or institutions that need to distribute product announcements, company or industry news, policy or procedure changes, maintenance updates or other news to a widely dispersed audience. Some of its customers are Eastman Kodak, Hewlett-Packard, DEC, Xerox and Merrill Lynch.

  - VideoStar, which now operates as an independent subsidiary of EDS, complements the video production capabilities of EDS' affiliate, Automatovie Satellite Television Network Inc. VideoStar will also make it possible for EDS to offer its line of training and educational programmes now available on its international network to customers of both EDS and VideoStar.

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- In November 1988, EDS acquired the data processing operations of Texas Commerce Bancshare's 27 correspondent banks.

- In November 1988, EDS acquired the data processing operations of Cullen/Frost Bankers' 54 correspondent banks.

- In September 1988, EDS acquired a 50% interest in and assumed management control of China Management System (CMS), the largest information services company in Taiwan.

  - CMS, with 1987 revenue of $10 million, specializes in systems integration, systems development, on-line processing, packaged software and management consulting. Its customers include government agencies, financial institutions, manufacturers and trading companies.

  - The agreement enables both organisations to extend their international links as well as compete more strongly for focal information processing contracts.

- In September 1988, EDS acquired General Data Systems Ltd. (GDS) of Philadelphia. Terms of the purchase were not disclosed.

  - GDS specializes in systems and services for the property and casualty insurance industry.

  - GDS had approximately 100 employees at the time of the acquisition. Since 1983, GDS' revenues have increased annually at a compound rate of 38%.

  - The operations of GDS have been merged into EDS' Commercial Insurance Division.

In March 1989, EDS and Hewlett-Packard signed an agreement that formally establishes the framework for cooperation on systems integration projects. Under the terms of the agreement, HP and EDS will submit joint proposals to customers for the development, design, management, and support of projects requiring the integration of hardware, software, and project management services.

EDS is currently organised into the following business units:

- The Government Systems Group

- The Financial Industry Group

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- The Insurance Industry Group
- The Commercial, Communications and International Services Group

The International organisation that controls all activities outside North America is one part of this last unit and is based in London. EDS has in excess of 7,000 employees in its international organisation.

Key Products and Services

A three-year summary of source of worldwide revenue by operating group is estimated by EDS as follows:

ELECTRONIC DATA SYSTEMS CORPORATION
ESTIMATED SOURCE OF REVENUE SUMMARY

	FISCAL YEAR (PERCENT)		
ITEM	1988	1987	1986
Financial and Insurance	22	18	15
Commercial, Communications, and International Services	17	16	13
Government Systems	14	14	12
Subtotal (a)	53	48	40
GM	47	52	60
TOTAL	**100**	**100**	**100**

(a) These estimates include certain revenue from GM that has been reported in the Commercial, Communications, and International Services and Financial and Insurance Groups.

EDS services are offered as follows:

- Facilities Management (FM): EDS assumes virtually all of the data processing and communications requirements for the customer over a multiyear term. Responsibilities include the design and implementation of business information systems, the staffing of the data processing functions, the development and maintenance of necessary software and the operation of all computer activities.

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- Systems Integration: EDS designs, implements and installs the appropriate combination of hardware and software integrated into a total system designed to fulfill the customer's processing and communications requirements.

- Fiscal Agent: EDS is responsible for all data processing functions as well as other administrative duties. These may include processing and paying claims as well as ensuring proper coordination of benefits.

- Professional Services: EDS provides system design, custom/contract programming, consulting, engineering services, education and training.

- Processing Services: EDS provides data processing services from an EDS data centre billed on a predetermined minimum monthly basis, usually based on the number of transactions.

- Some examples of international contracts awarded include the following:

  - During the first quarter of 1989, EDS signed a three-and-one-half-year agreement with BASF (a West German chemical company) to provide an information technology infrastructure for the chemical company's storage and packaging department.

  - In Spain, EDS will develop and implement an automatic warehouse system for Danone, a large producer of dairy products.

  - Under contract with DANZAS-SATEM (France), EDS will operate and maintain the company's distribution systems.

  - EDS' seven-year contract extension with French manufacturer Gallay provides for administrative systems and manufacturing applications services.

  - Also during the quarter, EDS negotiated a 10-year contract with the International Bank of Asia (Hong Kong) to assume responsibility for its information technology systems.

  - In December 1988, EDS of Canada Ltd. received a five-year contract to provide complete processing services for CAMI Automotive Inc., a joint venture between GM of Canada and Suzuki.

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- In February 1988, EDS was awarded a seven-year agreement with the United Kingdom Civil Aviation Authority (CAA) to manage the CAA's administrative computer systems and headquarters data centre. EDS is also participating in the development of improved communications between CAA's departments. The operation of 60 offices will be linked through minicomputer installations, which are to be integrated with a headquarters administrative system.

- During 1988, EDS and Shearson Lehman Hutton finalised a five-year agreement for EDS to implement an extended application of TradePro for Shearson's international operations. This is in addition to EDS' work in support of Shearson's U.K. securities trading in capital markets and international equities.

- EDS will assist France Telecom in the implementation of telecommunications capabilities that will allow France Telecom to provide integrated voice and data services to its customer.

- During 1988, EDS won a contract extension with Unilever, the Anglo/Dutch consumer products company, to provide FM and systems integration services for ten Unilever operating companies.

- EDS signed a five-year contract with Sociaal Fonds Bouwijverheid, the social security administration for the Dutch construction industry, to install and operate a pension fund system.

- EDS finalised an eight-year contract with Netherlands shipbuilder Verolme Scheepswarf Heusden BV to develop and manage new financial and reporting, personnel, time registration and production systems.

- EDS currently has more than 250 international contracts with clients in various industries.

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Financial Information

On a worldwide basis, EDS' total 1988 revenue reached $4.8 billion, a 9% increase over 1987 revenue of $4.4 billion. Net income rose 19%, from $323 million in 1987 to #384 million in 1988. A five-year financial summary follows:

ELECTRONIC DATA SYSTEMS CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
(% millions, except per share data)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$4,844.1	$4,427.7	$4,366.0	$3,443.3	$947.5
• Percent increase from previous year	9%	1%	27%	264%	295%
Income before taxes	$589.4	$524.3	$464.0	$362.1	$138.7
• Percent increase from previous year	12%	13%	28%	161%	19%
Net income	$384.1	$323.1	$260.9	$189.8	$80.7
• Percent increase from previous year	19%	24%	37%	135%	24%
Earning per share	$3.15	$2.65	$2.13	$1.57	$0.67
• Percent increase from previous year	19%	24%	36%	134%	24%

A further breakdown of 1988, 1987, and 1986 revenue follows ($ millions):

	FISCAL YEAR ($ MILLIONS)		
REVENUE SOURCE	1988	1987	1986
System and contracts			
• Outside customers	1,907.6	1,444.8	1,127.7
• GM and subsidiaries	2,837.0	2,883.3	3,195.1
	4,744.6	4,328.1	4,322.8
Interest and other	99.5	99.6	43.2
TOTAL	**4,844.1**	**4,427.7**	**4,366.0**

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Revenue for the three months ending March 31, 1989 reached $1.29 billion, an increase of $165.8 million (15%) over revenue of $1.12 billion for the same period in 1988. Net income for the period rose $10.9 million (12%) from $89.1 million to $100.0 million.

Approximately 59% ($2.8 billion) of EDS' total 1988 revenue was derived from its parent company, GM, and 2% was derived from interest and other. The remaining 39% ($1.9 billion) of total revenue was derived from clients in various industries, including banking and finance, insurance, manufacturing, retail, distribution, transportation and energy. INPUT estimates that approximately 10% ($190 million) of this was generated from international sources of which $175 million was from within Western Europe.

INPUT's analysis of EDS' non-GM revenues in 1988 in Western Europe is as follows:

Geographic Markets:

France	29%
West Germany	9%
U.K.	31%
Italy	6%
Netherlands	14%
Belgium	3%
Spain	6%
Sweden	1%
Norway	1%

INPUT Market Sectors:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	93	53
Network Services	6	3
Software Products	10	6
Professional Services	47	27
Systems Integration	19	11
Turnkey Systems	-	-
Customer Services	-	-
TOTAL	**175**	**100**

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COMPUTER SCIENCES CORPORATION
European Headquarters
Avenue Louise, 350 Bte 1
1050 - Bruxelles - Belgium
Tel. No.: +32-2-6450303
Fax No.: +32-2-6473702

The Company

Computer Sciences Corporation (CSC), founded in the United States in 1959, is one of the largest independent professional services company in the world. Serving government and commercial clients, CSC provides requirements analysis, software development, systems engineering and integration, communications, turnkey computer-communications systems, and facilities management services. The company also provides industry-specific proprietary products and services for credit reporting, claims processing, health maintenance organizations, income tax preparation, and manufacturing and distribution applications. It also provides value-added communications and remote computing services via INFONET, CSC's international data communications network, although it now only has a 40% interest, having sold shares to a variety of telecommunications authorities, primarily in Europe. The ownership structure of INFONET is shown below:

COMPANY	COUNTRY	PERCENT
Transpac	France	15
DBP	W. Germany	15
OTC	Australia	5
RTT	Belgium	5
Telainvest	Sweden	5
Telefonica	Spain	5
STI	Singapore	5
PTT Telecom	Netherlands	5
CSC		40

CSC has redirected the emphasis of its INFONET services from traditional computer timesharing to worldwide data communication and electronic messaging services.

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- Value-added network services are marketed to multinational commercial organizations that have a need for data communications among widespread facilities in the U.S. and abroad.

  - Offered is a high-performance packet-switch network that links customers' terminals, personal computers, minicomputers, and mainframe computers.

  - INFONET offers multiple protocols worldwide with asynchronous X.25 and 2780/3780 and 3270 bisynchronous and SNA/SDLC support.

  - INFONET maintains a staff of "in-country" personnel versed in local languages and business customs to interface with local regulatory agencies and to provide on-site support in 29 countries.

  - In January 1988 CSC signed an exclusive five-year agreement to market Quotron Systems' QUOTDIAL financial information service to individual investors and small brokerage firms outside the U.S. as part of CSC's INFONET services.

CSC's management objectives are to continue to maintain strong revenue growth and a leading position in the U.S. federal government marketplace, while increasing the percent contribution of revenue from other sources through both internal growth and acquisitions. The company plans to invest over $200 million in acquisitions by fiscal 1991, primarily in professional services and the fields of consumer finance, health care, and insurance. The company is giving major attention to the emerging commercial and international markets for systems integration services, drawing on its experience in large U.S. federal systems integration programs.

Computer Sciences Europe, headquartered in Brussels, manages the activities of subsidiaries in Belgium, the Netherlands, Switzerland, the United Kingdom, and West Germany. These units provide commercial professional services and as of March 1989 employed around 600 people.

Recent acquisitions in Europe were:

- Mid 1988: Corporate Management Services (subsidiary of CSC) bought Index Group Inc., a consultancy firm

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- April 1989: Agreement to purchase CIG INTERSYS (Belgium). The acquisition should double CSC revenues in Europe.

Examples of CSC professional services contracts in Western Europe are:

- CSC's German subsidiary is ensuring JIT delivery of materials by steel suppliers to automobile manufacturers by interconnecting their computer systems with those of the German Railways. CSC had previously directed the development of the railway's own freight management systems. CSC also has contracts with Austrian railways and for gateways for Spanish rail and major shipping companies in Spain and Italy.

- CSC is supplying technical management of the computerization of Britain's income tax withholding system. Estimated to cost over $340 million, the project involves the records of 27 million taxpayers and 18,000 terminals linked by an X.25 packet switch network to 11 processing centers. CSC is a leading team of government and contractor personnel in hardware procurement, system development and implementation.

- Other current activities include:

  - A national system for patents and trademark registration in the U.K.

  - On-going support of a command and control system for the German navy's northern maritime headquarters.

  - The modernization of administrative systems for government agencies in Belgium and the Netherlands.

CSC provides its U.S. products and services through the following operating groups:

- Federal Systems and Services, represented by the operations of CSC's Systems Group (headquartered in Falls Church, VA), is the company's primary provider of technical services to the federal government. Services provided include system engineering and integration, the development of custom-designed computer-based systems and communications systems, operational support of clients' technical activities, clients' computer facilities management, and turnkey system development.

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- The Systems Division, headquartered in Falls Church (VA), primarily designs and builds systems for office information, digital documentation, and administrative support.

- The System Sciences Division, headquartered in Silver Spring (MD), provides systems engineering, analysis, software development, and end-to-end integrated data systems and services primarily to aerospace clients such as NASA and the FAA.

- The Network Systems Division, headquartered in Falls Church (VA), designs and builds communications networks and real-time telemetry systems for military and civil agencies of the government.

- The Special Projects Division, headquartered in Falls Church (VA), performs high-level technical management projects, known as systems engineering and technical assistance (SETA), for the government. The division also performs research and development in systems and software technologies, and special activities in signal processing, communications systems, and information processing.

- The Systems International Division, headquartered in Herndon (VA), markets and supports systems and consulting contracts in the Middle East, Asia, and South America.

- The Applied Technology Division, headquartered in Falls Church (VA), provides facilities management services, primarily for NASA; provides operations and maintenance services to aircraft and weapons test centers; and provides software development support to federal agencies. This division includes the operations of the former Energy Research Division which manages a contract with the Department of Energy.

- The Defense Systems Division, headquartered in Moorestown (NJ), designs and develops military systems for weapons control, logistics, wargaming, training, and command and control.

• Health and Insurance Systems provides processing services, turnkey systems, and associated services through two separate business units as follows:

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- The Health and Administrative Services Division, headquartered in Sacramento (CA), performs Medicaid facilities management processing for state governments; manages the National Flood Insurance Program for the Federal Emergency Management Agency; and processes black-lung medical claims for the Department of Labor.

- CSC Comtec, Inc., headquartered in Farmington Hills (MI), provides turnkey systems and services to health maintenance organizations, preferred provider organizations, third-party administrators, and traditional indemnity plans.

- Professional Services, headquartered in El Segundo (CA), provides requirements analysis, system design, software development, system engineering and integration, communications systems engineering, and facilities management for non-federal organizations in industry and government. These activities are performed by:

  - Computer Partners Inc., a wholly owned subsidiary based in Waltham (MA)

  - Communications Industry Services, based in Piscataway (NJ), which specializes in services to telephone companies

- Credit Services provides consumer credit reporting and collection services to credit grantors and independent credit bureaus through Associated Credit Services, Inc., a wholly owned subsidiary based in Houston (TX).

- Network Services, headquartered in El Segundo (CA), provides value-added network services, enhanced data communication services, and remote computing services on an international basis. Service is focused on international markets for data communications.

  - The INFONET Division, headquartered in El Segundo, markets data communications services to commercial and international clients.

  - The Government Systems Division, headquartered in Arlington (VA), markets remote computing and data communications services to agencies of the federal government.

  - The Development and Operations Division, headquartered in El Segundo, supports R&D application development, data center operations, and maintenance of the network.

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- Complementary Services provides industry-specific products and services through the following units:
  - The TACS Division, based in Los Angeles (CA), processes income tax returns for tax preparers.
  - CSC Compufact, Inc., headquartered in Garden Grove (CA), provides turnkey systems, application software, and professional services to manufacturers and distributors.
- An analysis of CSC's sources of revenue by business unit follows:

REVENUES BY TYPE OF BUSINESS SERVICE
FISCAL YEAR 1989

	$ MILLIONS				
	FEDERAL GOV'T	COMMER-CIAL	STATE & LOCAL GOV'T	INTER-NATIONAL	TOTAL
Federal systems & services	863.9	9.6	3.9	3.7	881.1
Consulting services	2.4	80.9	1.8	58.7	143.8
Credit services	0.7	110.2	-	-	110.9
Health & insurance systems	29.2	18.9	31.3	-	79.4
Network services (1)	25.2	22.4	0.1	16.0	63.7
Complementary services	-	25.5	-	-	25.5
TOTAL	**921.4**	**267.5**	**37.1**	**78.4**	**1,304.4**

(1) Nine months' revenues because of Infonet shares sale.

Key Products and Services

Professional services provided by CSC include:

- Systems integration of custom designed computer-based systems and communications systems
- Operational support of clients' technical activities
- Management of clients' computer facilities, including the provision of all information processing requirements

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- The development of complete information systems, where CSC provides and integrates all of the hardware, software, training, and related elements required for delivery of operational systems

- The group has extensive experience in software development for aerospace and defense systems and systems engineering and technical assistance in computer communications, intelligence, aerospace, logistics, and related high technology fields.

Financial Information

The following table provides a five-year financial summary for Computer Sciences Corporation:

CSC
FIVE-YEAR FINANCIAL SUMMARY
($ Thousands, except per share data)

	FISCAL YEAR				
ITEM	3/31/89	3/31/88	4/3/87	3/28/86	3/29/85
Revenue	$1,304,414	$1,152,351	$1,031,459	$838,587	$723,492
• Percent increase from previous year	13%	12%	23%	16%	2%
Income before taxes	$84,464	$71,351	$58,096	$42,764	$41,057
• Percent increase (decrease) from previous year	18%	23%	36%	4%	35%
Net income	$52,482	$43,524	$32,243	$23,948	$27,718
• Percent increase (decrease) from previous year	20%	35%	35%	(14%)	52%
Primary earnings per share	$3.28	$2.73	$2.08	$1.69	$2.02
• Percent increase (decrease) from previous year	20%	31%	23%	(16%)	53%%

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The revenue distribution in fiscal year 1989 by major worldwide markets was:

U.S. Defense Department	37%
U.S. Civil Agencies	23%
NASA	11%
Total U.S. Federal Government	71%
U.S. Commercial	20%
U.S. State & Local Governments	3%
International	6%
TOTAL	100%

INPUT estimates that approximately $85 million of CSC's revenues in calendar year 1988 were generated from the computer software and services market within Western Europe. The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	-	-
Network Services	15	18
Software Products	-	-
Professional Services	70	82
Systems Integration	-	-
Turnkey Systems	-	-
Customer Services	-	-
TOTAL	**85**	**100**

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MCDONNELL DOUGLAS INFORMATION SYSTEMS INTERNATIONAL
Boundary Way
Hemel Hempstead HP2 7HU
United Kingdom
Tel. No.: +44-442 232424
Fax No.: +44-442 56454

President: Jeremy Causley
Director of Marketing: Brian Richardson

The Company

McDonnell Douglas Information Systems (MDISI) is a wholly-owned subsidiary of McDonnell Douglas Corporation of the U.S. MDISI represents some 9% of the revenue of its parent, $1.3 billion, out of a total of $15.1 billion for 1988.

MDISI is established in the U.K., and employs some 2,000 staff. It was created by McDonnell Douglas Corporation in April 1984 out of three key elements--Microdata, McAuto and TYMNET.

In the 1970s, the Computer Machinery Company of the U.K. was bought by Microdata Corporation of the U.S. This hardware manufacturing operation was then bought by McDonnell Douglas in the late 1970s. In the 1960s, McDonnell Douglas had created McAuto Corporation to support all its internal EDP requirements. In March 1984, McDonnell Douglas bought Tymshare Inc. the operator of TYMNET.

The 1980s has seen an aggressive policy of acquisition by McDonnell Douglas. In late 1983, the management committed the corporation to a policy of major growth in the information services industry:

- January 1984--purchase of Computer Sharing Services Inc. for $69.2 million. CSS provided processing services primarily for the telecommunications industry, with 1983 revenues of $27 million.
- March 1984--finalized purchase of Tymshare for $312.7 million. Tymshare operated TYMNET and provided network and processing services. 1983 revenues were approximately $297 million.

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- January 1985--announcement of purchase of the U.K. subsidiary of Tymshare Inc. from Unilever, Tymshare U.K. Terms were not announced.

- December 1984--acquired Science Dynamics Corporation of the U.S. SDC provided processing services and turnkey systems in healthcare. Terms were not announced. SDC's 1983 revenue was approximately $18 million.

- April 1985--acquired Applied Research Cambridge Ltd. of the U.K. for approximately $12.5 million. ARC specialized in CAD systems, with 1984 revenues of some $12 million.

- April 1987--acquired Isis Computer Services of the U.K. for £3.3 million. Isis specialized in PICK software and applications for payroll, personnel, police and local government on McDonnell Douglas hardware.

- February 1988--acquired Pro Computer Sciences of the U.S. Terms were not announced. Pro had developed Pro-IV, a 3GL applications generator, which was sold through Prolab of the U.K.

- 1988--reported to have acquired Northgate Computer Services. Terms were not announced. Northgate specialized in PICK systems for city and central government.

In 1988, there were signs of MDISI cutting back on its North American operations. It sold Vitek, one of its three North American healthcare businesses. It announced that it would probably sell its Health Systems Company in 1989, and it sold its cheque verification business, TeleCheck.

In late 1986, MDISI and British Telecom of the U.K. tried a joint venture on EDI, but this was abandoned by both firms. Then in August 1989, MDISI announced the sale of the North American side of TYMNET to BT for $355 million. The turnover of the North American TYMNET operations were about $250 million. It is rumoured that BT may use the international side of TYMNET that remains with MDISI for its international network services.

It also announced that it would move the headquarters of MDISI from the U.S. to the U.K. Jeremy Causley, President of MDISI, is still located in the U.S. and will soon be moving to the U.K.

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Key Products and Services

MDISI is split into four business units, reflecting its products and services:

- Computer systems and networking
- Systems integration--CAD/CAM and professional services
- Finance
- Health

The computer systems and networking consists of the U.S. and U.K. manufacturing operations, plus TYMNET. However, in 1988 the company discontinued direct sales of computer systems in North America. The other three business units deliver turnkey systems, plus associated professional services. They also provide IBM consultancy.

TYMNET offers a range of managed data network services outside of the U.S., such as E-mail, On Tyme, and database services. Its EDI service, EDI*Net has been confined to North America. It is linked into TransPac via an X.75 gateway.

MDISI's major CAD/CAM/CAE system is UNIGRAPHICS. It is sold to manufacturing and engineering sites, such as aerospace and automotive manufacturers. CAD/CAM systems are very important to MDISI, representing some 40% of its revenue.

MDISI has targeted the City of London via its Financial Unit. It did not enter the market until after Big Bang. It then identified strategic development areas. It has developed its Fund Management Investment System in conjunction with CIN Management, the manager of British Coal's pension fund, and Northgate Computer Services, which it subsequently bought as reported above. It has also signed a marketing agreement with Save & Prosper, the U.K. financial institution to sell its in-house unit trust investment administration system.

Various services are offered to local governments, such as road mapping systems and housing benefit systems. It has sold training systems, casualty recording and identification systems to the police, and the NHS in the U.K. is a major customer.

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Financial Information

The following is a five-year summary of MDISI's financial position:

FIVE-YEAR FINANCIAL SUMMARY, 1984-1988

	FISCAL YEAR ($ MILLIONS)				
	1984	1985	1986	1987	1988
Revenue	880	1,150	1,190	1,237	1,289
Annual growth rates		31%	3%	4%	4%
Operating profit/(loss)	(48)	(108)	(60)	(42)	(76)

A breakdown by country for worldwide 1988 revenue is as follows:

	1988	PERCENT	
COUNTRY	$ MILLIONS	EUROPE	WORLDWIDE
U.K.	248	66	
France	42	11	
W. Germany	50	14	
Benelux	20	5	
Rest of Europe	14	4	
Total Europe	**374**	**100**	29
Other Non-U.S.	64		5
U.S.	850		66
WORLDWIDE	**1,288**		**100**

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INPUT estimates that approximately $355 million of MDISI's revenues in calendar year 1988 were generated from the computer software and services market within Western Europe. The following table shows the analysis of these revenues across INPUT's market sector definitions:

INPUT MARKET SECTOR	$ MILLIONS	PERCENT
Processing Services	-	-
Network Services	6	2
Software Products	29	8
Professional Services	40	11
Systems Integration	-	-
Turnkey Systems	280	79
Customer Services	-	-
TOTAL	**355**	**100**

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COMPANY PROFILE

ISTEL LIMITED
P.O. Box 5
Redditch
Worcestershire
B97 4DQ
+44-527-64274

John Leighfield, Chairman and Chief Executive
Chris Chiles, Managing Director

The Company

Istel started life in 1979 as **BL Systems Ltd.** It was formed to provide an organisation dedicated to the provision of computing, communications and systems services. The company was wholly owned by British Leyland (and subsequently the Rover Group).

Istel was privatised in June 1987 in a management-led employee buyout from the Rover Group. The share ownership of the company following the privatisation is as follows:

Senior management	38%
Employees	28%
Institutional investors	34%

Key Products and Services

ISTEL's two main activity areas are computer-integrated-manufacturing (CIM) and network services.

ISTEL's skills and experience in the CIM area come mainly from its association with the Rover Group companies in the past.

ISTEL operates its network services over its own nationwide communications network.

In addition, **ISTEL** provides its customers with a wide-range of products and services including industry-specific bespoke systems and packaged software, consultancy and project management, IBM mainframe bureau processing, commercial and engineering timesharing, and hot restart disaster recovery services

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The following is a breakdown of the 1987 revenues of **ISTEL** by activity; the corresponding 1983 breakdown is also given for comparison.

	1987	1983
Computer application processing	31.8%	50.0%
Systems and consultancy	40.3%	40.0%
Network services	13.4%	4.5%
General systems and software products	14.5%	1.5%

The split by type of client for 1987 was as follows:

	1987
Rover Group companies	57.2%
Manufacturing and engineering	16.0%
Distribution	6.6%
Financial services	8.1%
Leisure	3.3%
Health	2.3%
International	2.3%
Other	4.2%

By comparison, in 1983, **ISTEL** derived 89% of its revenues from the Rover Group, with the remainder coming from the manufacturing and engineering sector.

ISTEL supplies the following products as publisher:

PRODUCT	DESCRIPTION
WITNESS	Visual interactive modelling system
VISIT	Vehicle routing and delivery scheduling system
COMET	Electronic messaging
EDICT	Electronic data interchange
PYRAMID	Manpower planning model
TRAVELBANK	Travel industry applications

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Financial Information

The following is a financial summary of ISTEL for 1983 to 1987:

FIVE-YEAR FINANCIAL SUMMARY, 1984-1988

	£ MILLIONS				
	1984	1985	1986	1987	1988
Revenues					
- Rover Companies	29.7	35.0	38.7	40.2	N/A
- Other Companies	7.8	14.7	22.1	29.9	N/A
TOTAL	37.5	49.7	60.8	70.1	80.2
Profit Before Tax	(0.2)	1.7	2.2	5.0	8.0

Recent Developments and Strategy

Although **ISTEL** has left the Rover Group, its relationship with the company is still a close one. The Rover Group remains **ISTEL**'s most significant customer, providing over 50% of revenues in 1987.

However, the separation has freed **ISTEL** to expand through acquisition. The company has already taken over some small businesses, and has plans for more.

ISTEL's focus for the future will continue to be on CIM and on communications network services, both of which the company believes have tremendous growth prospects.

In terms of industry sectors, **ISTEL** sees potential opportunities for the future on the retail side of financial services and in the health care field. **ISTEL** has already had significant success with its computerised life assurance quotation service.

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THE BIS GROUP
20 Upper Ground
London SE1 9PN
+ 44 - 1 - 633 0866

Roger Graham, Chairman and Managing Director

The Company

The Business Intelligence Services (BIS) Group was founded in 1964.

It was acquired by the U.S. owned telecommunications company NYNEX (1987 revenues $12.1 billion) in February 1987.

The Group is split into four divisions, they are:

- Banking Systems
- Direct Marketing
- Information Systems
- Marketing Information

As of December 31, 1988, BIS had approximately 1,600 employees.

Products and Services

The BIS Group supplies application software systems to the international banking, insurance and investment management industries. Such systems incorporate consultancy, installation, maintenance, training and development services.

The company offers information systems management consultancy to give direction, support and formal techniques to enable companies to plan and control the evaluation, development and implementation of information systems. It also supplies security systems.

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BIS Group products include:

- **BIS Midas**, an international banking system installed in more than 500 sites worldwide.
- **BIS Folio**, a general insurance system
- **BIS Fundmaster**, an investment management system
- **BIS/IPSE**, automated systems development package

BIS's revenues in 1987 were distributed between its four divisions as follows:

Banking Systems	45%
Information Systems	27%
Direct Marketing	21%
Marketing Information	7%

The apportionment by industry sector was:

Banking, Finance	70%
Manufacturing, Processing, Electronics	12%
Government, Utilities	7%
Distribution, Services	6%
Miscellaneous	4%

BIS operates worldwide. In addition to the U.K., the company has offices in France, West Germany, Luxembourg, Ireland, North America, the Far East and Australia.

The split of BIS's 1987 revenues by geographic region was as follows:

U.K.	57%
Rest of Europe	16%
Americas	10%
South-East Asia	9%
Australasia	7%
Africa	1%

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Financial Information

The following is a summary of BIS's financial results and employee numbers for the past four years.

BIS REVENUE RESULTS AND EMPLOYEE NUMBERS

ITEM	1984	1985	1986	1987	1988
Revenues (£ Millions)	36.5	40.4	56.2	68.1	83.6
Operating company profit (£ Millions)	2.7	4.1	6.9	8.9	9.4
Employees	956	1,035	1,236	1,450	N/A

BIS Strategy

The following are the stated goals of the BIS Group:

- To be a leader in the information industry, including computing, telecommunications and marketing services
- To work in long-term partnership with major organisations worldwide to assist them to achieve profitable growth and increased productivity
- To be known as a company that provides innovative solutions based on quality products and services
- To operate profitably to secure the future for clients and staff

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Appendix: Presentation Material

Appendix: Presentation Material

This appendix provides the hard copy of the material used at the presentation to SD-Scicon's European Board on the 6th of September 1989.

Information Services
Industry Trends

INPUT

NOTES:

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MPRE89-3

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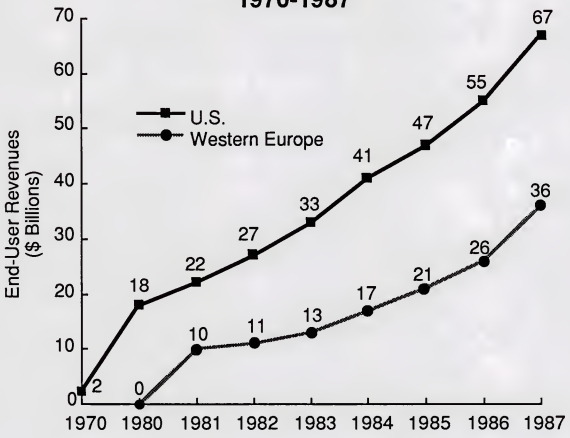
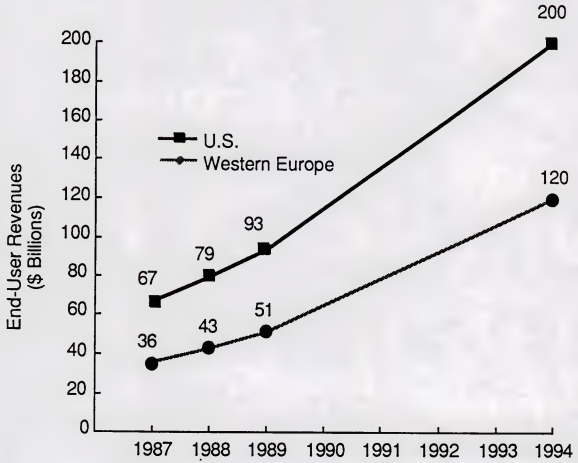
GROWTH IN THE SOFTWARE SERVICES INDUSTRY 1970-1987

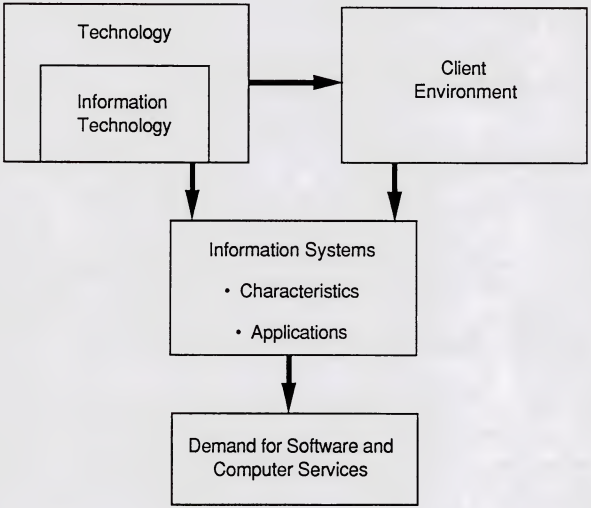


Note: Definition changes and dollar exchange rate differences (notably between 1986 and 1987) have slightly affected gross market sizes on a year to year basis.

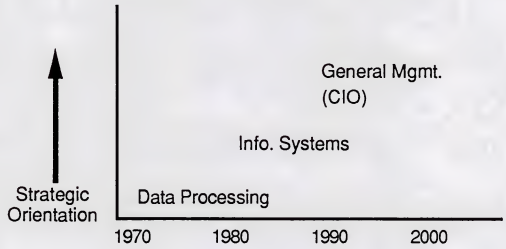
FORECAST GROWTH IN THE SOFTWARE AND SERVICES INDUSTRY 1989-1994



MARKET DRIVING FORCES



ORIENTATION OF THE RESPONSIBILITY



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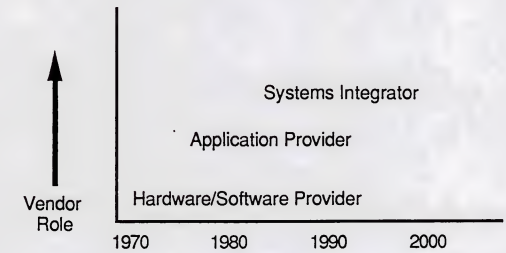
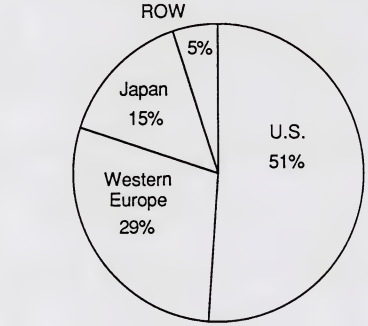
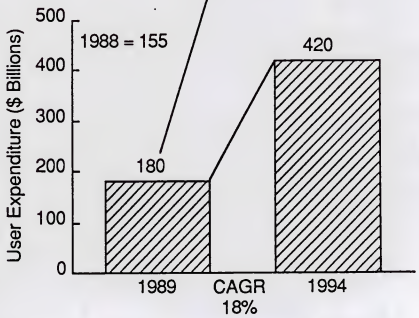
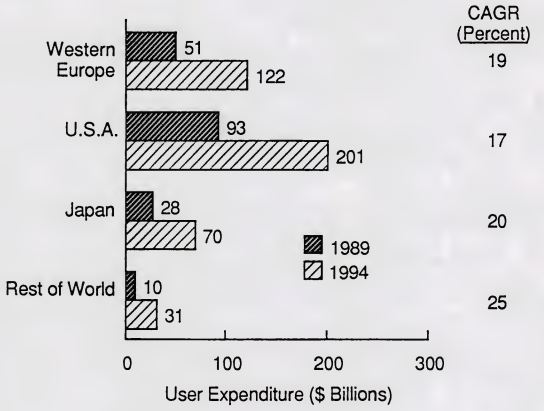


WORLD SOFTWARE AND SERVICES MARKET

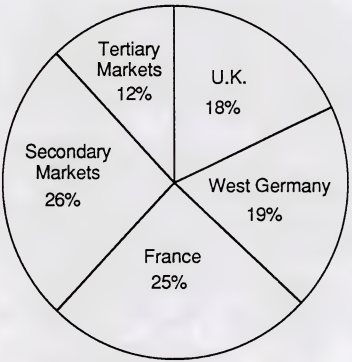




WORLD SOFTWARE AND SERVICES MARKET BY MAJOR GEOGRAPHIC REGION 1989-1994

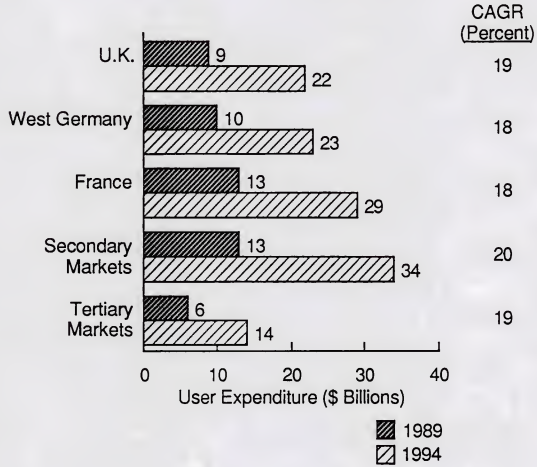


WESTERN EUROPEAN SOFTWARE AND SERVICES MARKET

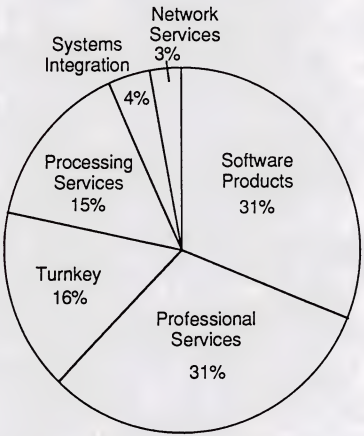


1989 $51 Billion
(1988 $43 Billion)

WESTERN EUROPEAN SOFTWARE AND SERVICES MARKET BY MAJOR GEOGRAPHIC REGION, 1989-1994

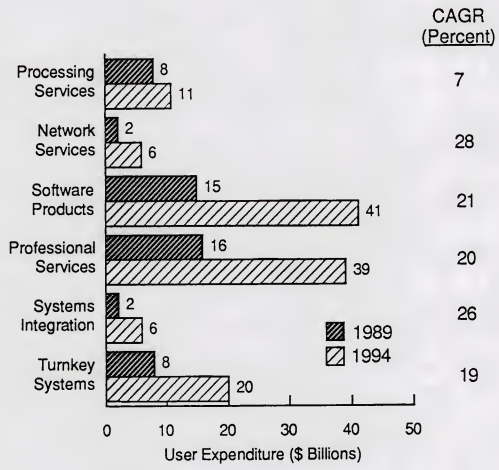


WESTERN EUROPEAN SOFTWARE AND SERVICES MARKET



1989 $51 Billion
(1988 $43 Billion)

WESTERN EUROPEAN SOFTWARE AND SERVICES MARKET BY MARKET SECTOR, 1989-1994



COMPARATIVE MARKET SIZE
W.E. AND U.S.

Market Size ($ Billions)	20	50	80	110
W.E.	1984	1989	1992	1994
U.S.	1981	1986	1988	1990

(First year market size exceeded.)

WESTERN EUROPEAN SOFTWARE AND SERVICES MARKET LEADING VENDORS

Rank	1979	Percent	1987	Percent
1	IBM	6.3	IBM	8.3
2	GSI	2.3	Nixdorf	3.0
3	ICL	1.8	Unisys	2.0
4	GEIS	1.5	CGS	1.5
5	CGS	1.4	Siemens	1.5
6	CICI	1.3	Digital	1.3
7	SEMA	1.3	Finsiel	1.2
8	SCICON	1.2	Reuters	1.1
9	SG2	1.2	Transpac	1.0
10	CDC	1.1	Olivetti	0.9
Total		19.4		21.8

INFORMATION SERVICES
LEADING VENDORS

Vendors	1988 U.S. Revenues ($B)*	Market Share (Percent)
IBM	5.7	7
EDS	1.7	2
ADP	1.6	2
DEC	1.3	2
Unisys	1.2	2
CSC	1.0	1
Arthur Andersen	1.0	1
McDonnell Douglas	0.9	1
CDC	0.9	1
Computer Associates	0.7	1

Top Ten Vendors = 20% of Industry Total

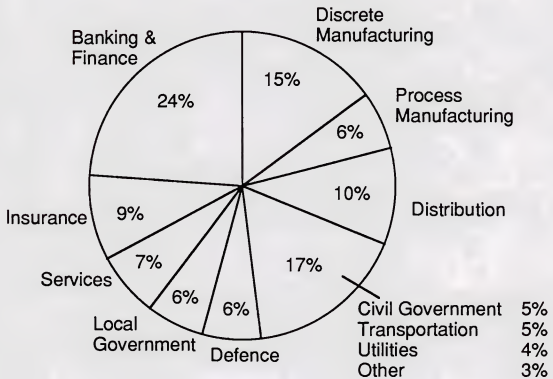
* INPUT Estimates

INFORMATION SERVICES
LEADING VENDORS

Vendors	1982 U.S. Revenues ($B)*	Market Share (Percent)
IBM	1.24	4.7
CDC	0.8	2.9
ADP	0.6	2.4
CSC	0.6	2.2
EDS	0.5	2.0
GEIS	0.5	1.9
Burroughs	0.3	1.2
McDonnell Douglas	0.3	1.2
Arthur Andersen	0.2	0.8
Computervision	0.2	0.8

Top Ten Vendors = 20.1% of Industry Total
* INPUT Estimates

EUROPEAN SOFTWARE AND SERVICES MARKET



1989 $51 Billion
(1988 $43 Billion)

Key Trends for the 1990s

- Products & Services Markets Blurring
- Changing Market Structure
- Internationalization
- Standards
- Vendor Reactions

INPUT

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JJ88-DW1-12

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Products & Services Markets Blurring

Traditional Competitors Are Changing:

- Traditional Product Companies Adding Services
- Traditional Service Companies Adding Products (Arthur Andersen, Peat Marwick)

New Competitors Emerge with "Solution Services"

- McKesson
- AMR
- John Deere
- Weyerhaeuser
- Bechtel
- CNB

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MPRE89-6a,b

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"Blurring" of Offerings Reflects
Changing Market Structure

- Systems Integration Continues to Emerge
- Interorganization Services Becoming Critical
- Computer Companies Emphasizing Communications
- Communications Companies Adding Computer Units

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"Blurring" of Offerings Reflects
Changing Market Structure

New Technologies Will Create
Additional Changes

- Image Processing
- Integrated Voice/Data
- High-Performance Digital Communications
- Object-Oriented Programming
- Personal Systems (IWS) Power

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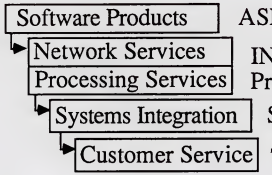
IBM as an Example



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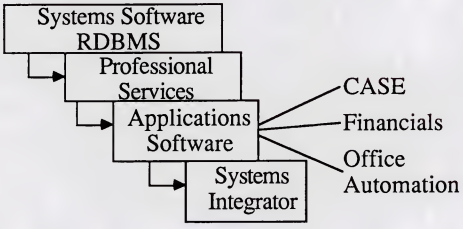
Oracle as an Example



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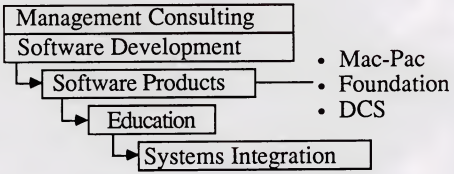
Andersen Consulting



$1.5 Billion
14,000 Professionals

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EDS

- Industry leader—16% market share
- Aiming for very large accounts
- Industry-oriented
  - Insurance
  - State and local government
- Broad range of systems: IBM, DEC, HP
- Ownership position in NAS

INPUT

Notes

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"Old"

Facilities Management

- Focus on Computer Operations

"New"

Systems Operations

- Development, Planning, Control, Operations

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Trends

Large Scale SI Projects

→

Systems Operations Contracts

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JJ88-VW2-31

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Trends

- Fixed Length Contracts are Out, Flexibility is In
- Users Become Vendors
- Ample Bandwidth Available
- Technical "Solutions" Search for "Problems"

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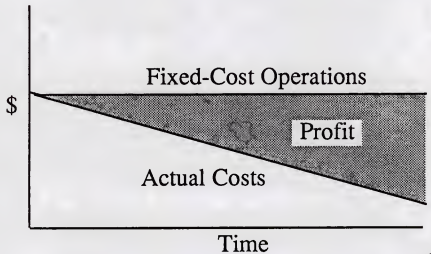
Systems Operations

Efficiency Yields Profits



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Trends in Systems Operations

- Network Management Contracts
- Development as well as Operations Included in Agreements
- Shared Resources Approach
- Mixed Hardware Offerings
- Vertical Market Focus
- Long-Term Contracts for Processing Services

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Systems Operations

Driving Forces

- Tight Labor Markets
- Difficulty in Paying Competitive Salaries
- Cost of Upgrading Systems
- Backup Requirements
- Systems Integration Creates Opportunities

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Appendix: Definition of Terms

Appendix: Definition of Terms

A

Revenue

- *Captive Computer Services Revenue* - Revenue received from users who are part of the same parent corporation as the vendors.
- *Noncaptive Computer Services Revenue* - Revenue received for computer services provided from users who are not part of the same parent corporation as the vendor.
- *Other Revenue* - Revenue derived from lines of business other than those defined above.
- *Total Company Revenue* - Revenue received from total computer services and other sources of revenue.
- *Total Computer Software and Services Revenue* - Revenue received from services provided by vendors that perform data processing using the vendors' computers (processing services), assist users to perform such functions on their own computers (software products and/or professional services), provide a combination of hardware and software integrated into a total system (turnkey systems), include consulting, education and training, programming analysis, and facilities management (professional services), provide for systems design, integration and installation (systems integration), or offer network, enhanced management services, electronic mail, electronic data interchange, or electronic information services (network services).

B

Service Modes

- *Processing Services*
  - Transaction Services: uses vendor equipment and software at vendor site or customer site; may be interactive or remote-batch-oriented.

- Utility Services: access to basic software tools enabling the users to develop their own problem solutions (language compilers, assemblers, DBMS, sorts, scientific library routines, etc).

- Other Services: carry-in batch processing, computer output microfilm services (COM), data entry services, disaster recovery/backup services.

- Facilities Management (Systems Operations): vendor provides a complete operating information system for customer including equipment, software, personnel and facilities.

• *Professional Services* - Management consulting activity related to EDP systems consulting, production of custom software, education and training, and systems operations of client-owned computers (formerly identified as facilities management), where the vendor provides human resources to operate and manage the client facility.

• *Systems Integration* - delivery of large, multidisciplinary, multivendor systems, incorporating some or all of these functions: systems design, programming, integration, equipment, networks, installation and acceptance. Systems can encompass multiple product delivery modes.

• *Software Products*

- Systems software and/or applications software packages purchased by users.

° Systems Software Products

Systems Control Software: operating systems, communications monitors, network control, library control, windowing, access control, security, etc.

Data Center Management Software: capacity management, scheduling, job accounting, performance monitors, tape management, utilities, downtime/repair monitoring management, etc.

Application Development Tools Software: application generators, assemblers, compilers, 4GLs, automated documentation, languages, translators, database management systems, data dictionaries.

° Applications Software Products

Cross-Industry Applications Software: used by clients in many or all vertical markets (i.e. payroll, word processing, spreadsheets, accounts receivable).

Industry-Specific Applications Software: unique to a specific vertical market and sold into that market only (i.e., demand deposit accounting, MRP II, hospital patient tracking).

- *Network Services*
  - Network Management and Enhanced Services: network management functions, network transmission facilities, augmented with computerized switching and features such as packet switching, electronic mail, store-and-forward message switching, terminal interface and error detection and correction.
  - Network Applications
    - Electronic Data Interchange (EDI): application-to-application electronic communication, based on established business document standards.
    - E-Mail: a range of services that transmits documents consisting of text and graphic material to be read by a person—with the quality of document being high.
    - All other application services in which the network is the principal part of the service, e.g., electronic funds transfer and some videotex services.
- *Electronic Information Services*
  - Databases that provide specific information via terminal-based inquiry such as stock prices, legal precedents, economic indicators, airline schedules, etc.
  - News services that offer current information, either general or for a specific category; i.e., financial or political
  - Other services that provide interactive access to databases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, etc.

- *Turnkey Systems* - an integration of systems software, packaged or customized applications software, CPU, equipment, and peripherals. These systems are developed to meet a specific set of user requirements. The value added by the vendor is primarily in the software, either packaged or custom-developed. Most CAD/CAM systems and many small business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.

C

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorised according to what users perceive they are buying.

Appendix: Forecast Assumptions

Appendix: Forecast Assumptions

EXHIBIT C-1

U.S. Dollar Average Exchange Rate

Country	Currency	Dollar Exchange Rate	
		1987 Figures (July 1988)	1989+ Figures (August 1989)
France	FF	6.13	6.32
Italy	It L	1,351.60	1,341.00
Netherlands	DFL	2.05	2.11
Spain	PST	121.40	117.00
Sweden	SK	6.29	6.38
Switzerland	SF	1.51	1.61
U.K.	£	0.59	0.60
West Germany	DM	1.82	1.87

Source: July 1988 - Swiss Bank
August 1989 - Barclays Bank

EXHIBIT C-2

Inflation Rate Assumptions

Country	1987 (Actual)	1988 (Actual)	1989 (Forecast)	1989-1990 (Forecast)
France	3.3	2.7	3.5	3.2
Italy	4.7	5.0	6.5	5.7
Netherlands	-0.5	0.7	1.1	1.8
Spain	5.3	4.8	6.3	5.5
Sweden	4.2	5.8	7.0	7.0
Switzerland	1.4	1.9	3.0	3.0
U.K.	4.1	4.9	7.7	5.5
West Germany	0.4	0.7	3.0	3.0
EEC	3.1	3.3	4.9	4.2

Source: Barclays Bank (August 1989)